GRAIN PRODUCTION AND UTILISATION IN RUSSIA AND THE USSR BEFORE COLLECTIVISATION

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Part Two: Grain production and utilisation in the USSR 1918-29: the available data

1. Grain statistics in the political and economic circumstances of the first twelve years of Soviet rule.

This period differs from the earlier periods by being far more complex. The task of correctly evaluating grain production and its utilisation was made much more complicated by several factors:

First, there can be little doubt that the peasant experience of the heavy hand of the desperate procurement officials led to a change in their attitude towards supplying reliable grain production data to the authorities.

Secondly, the agrarian revolution, social unrest and destruction of the former central organs of local administration, made the full and accurate enumeration of the level of sown area very difficult. This was particularly serious at a time when the level of sown area was changing dramatically.

Thirdly, the former Tsarist Central Statistical Committee (TsSK) had been disbanded and so an entirely new central statistical system had to be created.

Fourthly, the rivalry between different departmental interests in the government, and the attitudes of different groups in the party, created great pressures to distort the real level of production and to over-estimate the level of peasant concealment.

Fifthly, the attempts from the mid-1920s to plan the economy at large, and grain procurements in particular led to an increase of political pressure on the statisticians to provide accommodating pictures of the harvest prospects.

Finally, the appearance amongst the leading sections of the party leadership of an attitude of great distrust and lack of respect for the statisticians.

An account of the politics of the grain statistics and of the political significance of the different concepts of agricultural reality have been

described at length elsewhere[1]. In this introductory chapter I will briefly sketch out the manner in which the statisticians attempted to create a new statistical system to deal with the problems facing them, and how, ultimately, the political problems just became too overpowering.

a) The organisation of grain statistics in the early years.

The organisation of grain statistics in the early post-revolutionary years was in many ways a continuation and development of changes which had been brought about during the War and which had been accepted by the Provisional Government. As explained above, during the War major changes had occurred to the pre-war system of grain statistics. The agency using an administrative system of collecting agricultural statistics - TsSK had been dissolved and an increasing reliance was being placed on the zemstvo and Ministry of Agriculture statistics. The October Revolution did not immediately disturb the new pattern. The Statistical Departments of both the Ministry of Agriculture under Popov and the Ministry of Food Supply under Lositsky continued to work out the results of the 1917 agricultural census.

Popov called an All Russian Conference of Statisticians in Petrograd in December 1917 at which the plan for working out the census results was discussed.[2] And in the same month Lositsky completed the preliminary account of the state of the 1917 harvest[3].

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1. See S.G.Wheatcroft, 'Views on grain output, agricultural reality and planning in the Soviet Union in the 1920s', M.Soc.Sc.thesis,Birmingham, 1974.

2. See N.Ya.Vorobyev, ibid., p.406.

3. A.E.Lositsky, Urozhai khlebov v Rossii v 1917 godu, M.1918. Although this report was finally published in 1918 by the Moscow Oblast Food Supply Committee, Lositsky's introduction is clearly dated December 1917 and at that time Lositsky was still describing himself as the Director of the Statistico-Economics Department of the Ministry of Food.

However, by the end of December most of the central agencies concerned with the Provisional Government's Ministry of Food were dispersed and the leadership of food supply problems was placed in the hands of Narkomprod[1]. Lositsky lost his post and began working for some statistical agency attached to Mossoviet[2]. From this time the Central NKProd statistical agencies became less concerned with evaluating the overall grain availability position in the country than in accounting requisitioned grain.

The December Conference which Popov had called achieved little as regards getting the 1917 agricultural census worked out. The main problem appears to have been the failure of all the leadership of the Executive Committee of the Statisticians' Congress to support it. Groman appears to have been hostile to supporting the new Bolshevik Government at this time and the Ukrainian statisticians had decided in the changed political circumstances to have their own independent conference[3]. But those statisticians who did attend appear to have achieved some organisational successes. They discussed the question of the organisation of State statistics and were in favour of the creation of a new unified organ of state statistics. In line with their proposals, and no doubt partly as a reward for their loyalty, Popov's department of Census Statistics was transferred from NKZem to VSNKh[4].

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1. The position was, in fact, very complicated. There was at first some conflict at the top level between the collegium of NarKomprod and the Military Food Supply Commission (Voenno-Prod. Kom) (See Dikhtyar, Sovetskaya torgovlya, Tom II, p.72). NKProd was attempting to take over control of the former Ministry of Food's local food supply committees, while Voenno-Prod. Kom. was attempting to set up its own local committees. A SNK decree of November 25 formally transferred all leadership to NKProd, but this was not immediately carried out. (See Ya.K.Strizhkov, Prodovolstvenniye otryadi v gody grazhdanskoi voiny ...., M.1973 p.39)
2. See Trudy TsSU, Tom XXX, M.1928, p.15. This probably explains why Lositsky's report on the 1917 harvest was published by the Moscow Oblast Food Supply Committee.
3. See E.Z.Volkov, Agrarno Ekonomicheskaya Statistika Rossii, M.1923. p.267
4. See E.Z.Volkov, ibid., p.250

By the early months of 1918 the executive committee of the Congress of Statisticians had come round to making positive proposals about collecting grain statistics for the 1918 year[1]. But it was not until June 1918 that Popov's department in VSNKh and IKSS jointly called a full scale Congress of Statisticians, which began the process of reconstructing a Central Statistical Agency.

At this Congress P.I.Popov presented a speech on the organisation of state statistics, which was ultimately to form the basis of the SNK decree on this subject.

The main features of Popov's proposals were that the future statistical agency should be unified and centralised, that it should serve scientific as well as purely administrative purposes and that it should be given its own local agencies for carrying out and controlling statistical work. What was clearly envisaged was the spread of the network similar to the former zemstvo statistical network but more unified:

> The business of organising state statistics in the given conditions must take the form not of improving the system of the former administrative statistics, not to reform it even radically, but to create a new apparatus constructed so as to satisfy the demands made upon it, both by the state, which raised in this revolutionary period tasks of the radical reformation of social economic relationships, and by science - increasing our knowledge of the laws of social life and improving the methods of statistics.

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1. The IKSS proposals of April 27, 1918 were referred to in P.A.Vikhlyaev's speech at the June 1918 Congress of Statisticians. See VS., 1919, no.1. p.25.

> In place of the destroyed state apparatus for investigating and initially reworking statistical data, i.e. in place of Gubstatkom and the local officials, there must be set up other organs, more complete. With this aim it is necessary to use the statistical organs that we have in the country and not create new ones. The zemstvo and town statistical bureaus were correctly organised at the local level[1].

All of the above was quite acceptable to both the statisticians and the government at the time, although there was to be in the future much conflict over the exact division between scientific and administrative work, as we shall see later. The immediate cause of disagreement was over the relationships between the state and the statisticians, and the level of political independence of the statistiticans.

The Congress decided that it wanted the new statistical agency to be subservient to a Statistical Soviet which was to be elected from various academic and administrative agencies having an interest in statistics and this Soviet was to be totally independent of state agenices when it came to questions of statistical enterprise; the collection and processing of statistical materials and the interpretation of statistical data.

These proposals were communicated to Lenin, in his capacity as chairman of SNK, in a letter by Popov which emphasised the need that the statisticians felt for professional independent and explained why they needed their own independent supreme body, the Statistical Soviet:

> In order to rise to its historically determined tasks, statistics must be outside departmental politics (vnevedomstvennoi), they must be beyond subjective one sided influences and they must not be diverted from their basic tasks: objectively and truthfully to express

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1. P.I.Popov, Organizatsiya Gosudarstvennoi Statistiki, M.1918, pp.7,15.

> that which is, that which caused the present and
>
> that which the present is causing.

According to the project affirmed by the statisticians the central statistical system was to have its own Central Soviet as its own supreme body on purely statistical matters.

> In order to be sufficiently authoritative this Soviet should be independent from state and governmental bodies.... It should have a consultative role concerning tasks to be performed, but an unconditionally decisive role on questions of working out programmes of investigation, of processing materials on questions of methodology in general, and on the scientific interpretation of the results[1].

The statisticians' proposals did become the basis upon which most of the new central state statistical system was formed and it became the basis of the SNK decree that was signed by Lenin on July 25, 1918[2]. The decree granted the incumbent statisticians most of what they wanted. It created a new Central Statistical Administration (TsSU), it affirmed Popov in the role of director of TsSU[3] and Lenin appears to have decided to leave the statisticians to their own resources. But although the statisticians were in fact left very much to themselves, the decree failed to

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1. The above statements are taken from Popov's 'Dokladnaya zapiska' which was presented to Lenin in his capacity as chairman of SNK sometime between June 25 and July 25, 1918. This unique document is held in the Central State Archives of the National Economy of the USSR (TsGANKh) and was published for the first time in the journal of TsSU in 1967. (See VS, 1967, no.4, pp.41-45). The above statement is on p.43.
2. See SU, 1918, 55,611.
3. It is interesting to note that the statisticians reported that the Congress of Statisticians had elected Popov as director (See VS, 1919, no.1, p.169). The subsequent SNK decree however makes it quite clear that the Congress of Statisticians was given no such legal power and that the power of appointment lay with SNK. SNK however, did decide to appoint the man who had been elected by the Congress and thereby removed the immediate possible source of conflict.

guarantee the level of independence that the statisticians had wanted it to contain. The decree failed to place the new TsSU under an independent supreme statistical soviet, as the statisticians had asked for. It gave more authority than being merely the statistical department of VSNKh. And Popov was given consultative status in SNK. Later in 1924 this was increased to full representation in SNK[1].

In these early days, Lenin and the Bolsheviks could not afford to alienate these statisticians, even though they were not prepared to give them the sort of charter of rights that they appeared to be demanding.

There were many critics like Kautsky who doubted that the new Soviet state would have sufficient well qualified specialists to construct an accounting and statistical system necessary for socialist production and planning the economy. But as V.Starovskii a subsequent director of TsSU later wrote:

> One of the most important and remarkable facts of the early period of the creation of Soviet statistics was that the overwhelming majority of zemstvo statisticians and a significant number of the representatives of academic statistics were in the first ranks of that part of the Russian ntelligentsia which immediately went to serve for Soviet power[1].

Under Lenin's leadership of the state, even in the conditions of War Communism, the statisticians who had backed the Provisional Government continued to work for Soviet power. Lenin himself drew attention to the different political loyalties of the TsSU workers and noted that despite that they were on the whole working quite satisfactorily:

> We have a Central Statistical Authority which contains the best statisticians in Russia, most of the specialists are Right SRs, Mensheviks and even Cadets; there are very few Communists and Bolsheviks - they were more concerned with fighting against Tsarism than with practical tasks. These specialists, as far as I can tell are working satisfactorily, but this does not mean that we don't have to fight certain individuals[2].

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1. V.Starovskii, 'Sovetskaya statisticheskaya nauka i praktika', in Istorii Sovetskoi Gosudarstevnnoi Statistiki, M.1960, p.5.

2. V.I.Lenin, Sochineniya, vol.29, p.15. This statement was made at a session of the Petrograd Soviet in 1919.

Most of the statisticians in TsSU had experience in working in local zemstva in the Provisional Government's statistical offices. Most of the former heads of the local statistical offices either stayed on in the localities to head the new gubernia statistical bureaux GSB, or moved to Moscow to take up more responsible positions in central TsSU. The major exception to this patter appears to have been V.G.Groman. As already mentioned, Groman had played a major role in the organisation of state food statistics in the Tsarist Special Council on Food Supply and under the Provisional Government. Groman was at this time (summer 1918) chairman of the executive committee of statistical congresses and probably envisaged himself as president of the Statistical Soviet. Consequently he was the major loser in the change in the law project. As we shall see Groman did subsequently find a niche for himself in Gosplan SES and later in Statplan of the post-1926 reformed TsSU. The exclusion of Groman from the early leading cadres of TsSU and his subsequent appointment to a rival organisation (Gosplan SES) was perhaps one of the most politically divisive acts which affected the group of early Soviet statisticians and probably lay behind much of the subsequent bitterness in the relationships between TsSU and Gosplan[1].

Returning to TsSU in 1918, we see that although the statisticians had not got the guarantees of independence that they had been looking for, they appear to have got some form of informal assurance from Lenin that he would not interfere in their affairs, and that he would leave them to solve their problems in their own traditional and professional way.

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1. While discussing these possible personal factors it could also be noted that although Lositsky was made the head of a major TsSU department, this could only be considered a demotion in comparison with his former position as director of the statistical department of the Provisional Government's Ministry of Food. And consequently the personal bitterness in his future relationship with the director of TsSU could possibly also be based on personal resentment.

It is impossible to identify any party appointees in the leadership of TsSU at this time. TsSU was run by a collegium presided over by Popov.

Popov acted with great personal authority and independente. He was very close to Lenin, occasionally argued with him and on at least one occasion threatened to resign[1]. He advised Lenin on statistical matters as regards the state of the economy, and appears have been particularly important in providing the economic arguments for the change in policy that inaugurated NEP. He prepared materials for senior politicians and the party congresses but was not himself a party member until he joined in 1924. Even then he appears to have acted more as a channel through which the statisticians could effect party policy, rather than the reverse[2].

The members of the TsSU collegium were all bona fide statisticians. Most of them were the heads of the major departments of TsSU. They may have been formally appointed by SNK but they were all capable of holding their own at the periodic statistical conferences and congresses which took place. And there appear to have been no restrictions on the amount of criticism that could be made at these conferences and in the numerous statistical journals. The sessions and accounts of the conferences of the collegium were reported in the numerous statistical journals and bulletins and the impression is of a very open administrative structure, tremendous enthusiasm and unrestricted and passionate arguments.

Within TsSU there were several departments concerned with grain statistics. At first each of these departments was concerned with a different source of statistical material.

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1. This was in August 1921. Later, in January 1926 he did resign.
2. A session of the collegium of TsSU in the spring of 1925 formally requested him to take action along state and party lines to stop local state and party officials putting pressure on the local statisticians (See VS., 1925, No.4-5 p. 169)

N.I.Dubenetsky was in charge of the department of Current Agricultural Statistics, which received the data from the current reports and sample investigations (oprosy) carried out by the local correspondents and local statisticians.

A.I.Khryashcheva, Popov's wife, was in charge of the department of Agricultural Census Statistics and was concerned with organising the carrying out and the processing of the census and survey materials.

A.E.Lositsky, the former head of the Ministry of Food Statistical Department, was invited into TsSU to head the department of Consumption Statistics and was concerned with organising the carrying out and processing of agricultural consumption statistics.

Apart from these three departments, other departments were concerned with grain statistics in a less major way. Litoshenko's department of peasant budget studies, A.G.Mikhailovsky's department of Food Supply Statistics, Poplavsky's department of transportation statistics, Blyakher's department of land utilisation statistics and the departments of scientific methodology under Obukhov, Yastremsky and Chetverikov, were all involved with grain statistics to some extent.

All these departments within TsSU reported to the Collegium of TsSU and it was the collegium of TsSU which was ultimately responsible for coordinating the work of the different departments and making overall evaluations.

The task of evaluating the reliability of grain production and utilisation data and of reorganising the methodology by which the data were collected and evaluations were made, was repeatedly being discussed by the collegium of TsSU at this time and repeatedly being referred to the statistical congresses, conferences and special commissions for further more detailed

consideration. A special commission was set up under E.V.Pashkovsky, one of the deputy directors of TsSU to discuss this question.

The problem of evaluating the grain statistics was an extremely difficult one as well as being an extremely important one. The statisticians had to contend with on one side peasant hostility and distrust and on the other the suspicion and impatience of the government. They had to reconstruct a whole statistical system over an immense area, at a time when the economy was in considerable disarray. Their statistics were becoming of exceptional importance, at a time when they were finding it almost impossible to produce reliable statistics.

From the time of the setting up of TsSU in June 1918 until the creation of the 'Expert Soviet for the Evaluation of grain products' in 1926 control over methodology and statistical policy rested formally on the collegium of TsSU. The collegium often had extended formal discussions on the question of the collection and working out of grain statistics, and much of the detailed work was carried on in special commissions and also in the sessions of the statistical conferences and congresses which were held regularly throughout this period.

At first Popov and the leadership of TsSU were very reluctant to apply any specific correction to their grain production data. They had no great faith in the absolute reliability of their data. But they felt at the time that there was no adequate method of correcting them and that all corrections would be arbitrary.

Several prominent statisticians, who had held leading roles in the executive committee of the statistical congresses were not included in the collegium of TsSU but continued to take an active interest in the evaluation of grain statistics. Strumilin, Groman and the statisticians who surrounded them in Gosplan SES, some of the NKZem statisticians like Oganovsky, and even some of the major figures who were in the minority in the TsSU collegium like Lositsky were all impatient with TsSU's reluctance to apply corrections to their basic grain production data.

This group offered an alternative method of evaluation of grain production based on the so-called 'balance method', which was simply using utilisation statistics and consumption norms to check on the size of grain utilisation. It was argued that the peasants were less likely to distort the indications of their personal consumption levels, livestock feed levels, seed levels etc., than they were to distort the level of sown area or yield that they gave to the authorities. This was undoubtedly true for

the extreme circumstances of war communism and requisitioning and in the years immediately following it. The basic data on grain sown area and yield clearly suffered very greatly from concealment and under-reporting in these years. And TsSU did make several adjustments to its basic data to compensate for this under-reporting. Early in 1923 they began to apply a so-called half point correction which added about 20% to yield in normal years and more in low harvest years[1]. And in July on the eve of the 1923 harvest evaluation the collegium of TsSU acknowledged that a much larger correction, probably more than 20%, was needed above this level[2]. These corrections do appear to have been based on checking production data against the general indicators on grain utilisation and because of this TsSU refused to be drawn at this point as to how the additional 20% correction should be distributed between its sown area and yield data. TsSU proposed to defer the resolution of the problem of the exact location of this correction until more reliable data became available. It was carrying out a series of investigations to enable it to make more scientific evaluations of the required correction coefficients and as time passed it was sure that the peasants would gain faith in the new circumstances of NEP and that the reliability of the sown area and yield data would improve. The official attitude in TsSU was that in more normal circumstances the production data was bound to be more reliable than the utilisation data. The statistical data on many of the utilisation elements was of a poor quality. The budget studies upon which many of the utilisation elements were based tended to over-represent progressive

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1. See below p. 410-2
2. See VS., 1923, no.712, p.180.

farmers who tended to be wealthier and to produce and consume more grain than on the typical farm. Apart from this there were also problems of subjective upward distortions which appear to creep in to food consumption studies[1]. The TsSU leadership therefore rejected the claims of the dissident statisticians, that the utilisation data could serve as a more reliable indication of the level of grainproduction than the normal production data in normal circumstances.

The congresses of statisticians appear to have supported TsSU, but in the summer of 1924 the political leadership indicated its impatience with the statisticians. A very direct personal attack on the honesty of the statisticians was made by Stalin at the XIII Party Congress[2]. Stalin's attack was followed by more specific attacks from Strumilin and finally TsSU gave way and began applying specific corrections to its sown area and yield data, but these were on a smaller scale than those proposed by Gosplan and TsSU still refused to formally include the balancing method as part of their standard evaluation process. Conflicts between TsSU and Gosplan continued and were only resolved after Popov's resignation and the reform of TsSU in 1926.

The causes of Popov's resignation and this political crisis within TsSU at this time are not known with any degree of certainty. But there appear to have been several elements contributing towards the strain on the TsSU leadership at this time. The conflict with Gosplan had increased in connection with the preliminary evaluation of the 1925 harvest for inclusion in the 1925 control figures[3]. TsSU was also being heavily criticised for supplying the preliminary 1925/26 grain forage balance in a form with a socio-economic differentiation between the peasantry, which

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1. See above p.115
2. Stalin accused the statisticians of being dishonest, worse than bourgeois statisticians and accused them of holding up planning work. I.Stalin Sochineniya, Tom 6, p.214.
3. See S.G.Wheatcroft, ibid., Birmingham 1974, pp.38-45.

reflected a large share of grain surpluses coming from the wealthy peasants rather than from the serednyak group. This balance had been cited by Kamenev and members of the new left opposition much to the embarassment of the political leadership who were engaged on a policy of appeasement to the peasantry at this time. A special RKI investigation commission, recruited specialists hostile to the TsSU leadership (mainly Vishnevsky, Lositsky and Strumilin) to criticise this balance and provide a more politically acceptable one[1]. Apart from this the authorities appear to have indicated to Popov at this time that they could not afford to carry out the agricultural census which TsSU was proposing to carry out in 1926[2].

A final circumstance that may have been of relevance to Popov's resignation was Groman's attitude. By 1926 Groman had become an active member of the group of militant Marxist statisticians that were criticising the TsSU leadership from its journal.[3] And it was clear that Groman was closely associated with a major challenge to Popov's leadership.

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1. See S.G.Wheatcroft, ibid., Birmingham 1974, pp.49-53.
2. For an account of this proposed census see below p.335
3. Voprosy Statistiki. Kritsman from the Communist Academy and Strumilin were other leading members of the militant group of Marxist Statisticians behind this journal. The journal Voprosy Statistiki only appeared for a few numbers in 1926, after which most of its members were transferred to TsSU and they took over the TsSU journal Vestnik Statistiki. The more empirical TsSU articles were then transferred to another TsSU journal Statisticheskoye Obozreniye.

b) The organisation of grain statistics after 1926

Popov was replaced by V.V.Osinsky as director of TsSU. Osinsky was an old Bolshevik and a professional revolutionary and politician. rather than a statistician, although he did have some statistical experience[1].

Osinsky introduced a much firmer political control in TsSU. The size of the collegium was drastically reduced and new people more politically active were brought in at senior positions[2]. The evaluation of grain production and utilisation was taken out of the supreme control of the collegium of TsSU and given to a special Expert Soviet, which contained the representatives of other interested agencies, NKZ,Gosplan,NKTorg, NKRKI, who were to have ultimate responsibility over making the evaluations. Either Osinsky or one of his political deputies was to chair the expert council.

The departments within TsSU were grouped into sectors. Most department heads including Dubenetsky (in charge of current agricultural statistics) remained,but new men appeared in charge of the sectors. Nemchinov was brought in from the Urals to head the agricultural sector.

But at the same time as increasing political control Osinsky was careful not to alienate the statisticians. At a conference of local statistical workers in TsSU in June 1926 Osinsky assured the statisticians of his good intentions:

> Statistics must not be subservient to politics, must not be the servant of politics. The subservience of statistics to policy with the aim of getting statistics which corresponded with preconceived political conclusions would be above all a large political mistake.

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1. See above. p 26
2. Trakhtenberg and Kerzhentsev were brought in as Osinsky's more political deputies, above Pashkovsky and Krasilnikov his other deputies who were statisticians.

> If we did this we would lose an important instrument, that could give us the possibility of orienting ourselves in the real economic and social circumstances of the country. The tasks of statistical investigation are the setting of real objective facts[1].

And in a move that must have been even more reassuring to the old statisticians, he appointed Groman to the collegium of TsSU to take over directorship of Statplan, the statistical planning unit[2].

Osinsky does appear to have worked in the interests of his expressed aim of preserving statistical objectivity. In the conflict after the 1927/28 procurement crisis Osinsky argued with Stalin in the Party Central Committee about the harvest evaluation[3]. Throughout the campaign Stalin had been insisting that the 1927 harvest had been higher than the earlier harvest for 1926 and had been quite threatening to the Urals local officials for not accepting this[4]. There was no statistical basis for this evaluation as the statisticians knew and Osinsky appears to have politely informed the party leadership of this.

Osinsky was replaced as director of TsSU about this time by the far more amenable politician V.P.Milyutin[5]. Milyutin appears to have been much less prepared to defend the statisticians than Osinsky, but he also clearly had much less control.

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1. N.Osinsky, VS, 1927, no.1, p.298. In a speech to conference of the collegium of TsSU and local statistical workers held in June 1926.
2. See SZ, 1927, 2-5, Groman was appointed on 28.12.1926.
3. See E.H.Carr and R.W.Davies, Foundations of a Planned Economy, 1926-29, Vol.1, Part 1, pp
4. See I.Stalin, Sochineniya, Tom.11, M.1949, pp.2,12,39,83. See also S.G.Wheatcroft, ibid., Birmingham 1974. pp.107-110.
5. SZ., 1928, 11-43 His appointment dated from March 3, 1928. O.Yu.Shmidt and L.N.Kritsman also came into TsSU to be Milyutin's political deputies. Pashkovsky stayed on.

There was in 1928 probably a general political backlash against Stalin's extraordinary measures and the statisticians appear to have made use of it to remove some of the high corrections that they had been forced to apply to their grain production data, and to withstand political pressure to increase their harvest evaluations.

In 1928 it was possible for them to withstand some political pressure. But in the summer of 1929 after the defeat of the so-called right opposition, the pressure from the politicians to improve the harvest evaluations proved to be insurmountable. The Expert Soviet did apparently attempt to resist pressure from Mikoyan and the grain collectors to increase their harvest evaluation to help justify the high planned targets for grain collections but this brought them and Groman in particular heavy criticism from other political leaders, and ultimately led to the purging of the Expert Soviet[1]. This was soon followed by the abolition of TsSU, the arrest, trial and disappearance of Groman.

The political atmosphere within which the statisticians were working had changed drastically from the free and enthusiastic days in 1918 when the statisticians had demanded that SNK guaranteed their independence by giving them their own independent supreme statistical soviet. The deterioration in the political atmosphere within which the statisticians had to work had a very damaging effect on the reliability of the data they produced. And this rather than overcoming peasant concealment became the major statistical problem.

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1. See S.G.Wheatcroft, ibid., Birmingham 1974, pp.166-9.

2. Grain sown area data 1918-29

In this chapter I will be introducing and discussing many series of statistics on grain sown area. In order to assist the reader to find his way through these materials I have summarised the main figures from the main series in the two summary tables SA1 covering figures for the whole country and SA2 covering figures divided into my five major regional groups. These tables will be referred to throughout this chapter. The sources from which these figures were taken, the method of regrouping them and the data upon which the regroupings were based are all given in the appendix.

The data in the first columns of table SA1 and the first 5 sources in table SA2 refer to uncorrected data, the later figures all involve very substantial levels of corrections,

There are considerable problems involved in making comparisons between these different series of data. These problems are due to the differences in the coverage of the data and due to the differences in the reliability of the data. The question of the differences in coverage is a fairly technical question which can be fairly easily sorted out if the data are available in sufficient detail. The question of reliability is a far more complex problem, which is in the end insoluble. It is however hoped that by understanding more about how these figures were collected processed and adjusted, we will at least improve our understanding of the reliability of these data, even though we can never know their absolute reliability.

The coverage of these data differs in many respects. The area covered differs, the types of grain covered differ and the types of producer covered differ. Generally the figures given in table SA1 refer to the sown area of all grain, by all producers on rural land in the pre-1939 area of the USSR. In certain cases, especially in the early 1920s the only available data are those covering the USSR less Transcaucasia, Turkestan and sometimes

also less the Far East (Dalnyi Vostochnyi Krai), Yakutiya ASSR and Buryat Mongolia ASSR. The sown area for all these areas covered under 4 million hectares in 1924, which was less than 5% of all the grain sown in the USSR at that time. The figures marked with an asterisk in table SA1 refer to this smaller area, and of course they are readily visible in table SA2[1]

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1. Throughout the thesis I refer to the smaller area as the USSR - SCR. This is slightly inexact, because the area referred to sometimes includes also the Far East, Yakutiya and Buryat Mongolia which are all part of my EPR. In 1924 these areas covered about 0.9 mln.hectares. This is only about 1% of the total sown area but it is about 10% of the EPR. The EPR within series described as USSR-SCR must therefore be treated with particular care.

Table SA1

The major available series of data on grain sown area in the USSR in mln.hectares.

	Uncorrected data				Data including a large correction									
	Early TsSU				Mid TsSU	Gosplan	Expert 1927	Soviet 1928		TsUNKhU				Currently accepted
		p	p+np							p	p+np		p	p+np
	1	2		3	4	5	6	7	8	9	10		11	12		13	14
1909/13						83.74*											
1913	93.7								95.2*								
14	94.2																
1915	92.1																
16	83.8	80.6	87.1	80.2*		79.7*		86.1*									
17	77.9				79.5*	79.8*	84.0										
18																	
19							73.5										
1920				62.1*	62.6*	63.6*	67,6		81.5*								87.0
21						59.0*	61.		73.0*								79.8
22						47.7*			63.9*								66.2
23		61.6				(55.7)*		66.7*									78.6
24		65.8						71.6#			81.8	83.9					82.9
								74.7									
1925		70.1						75.6*		78.1/ 85.7	86.4	88.5	87.2				87.3
26		77.2								82.6/	93.1	95.3	93.5				93.7
27		80.3								90.8	95.6	97.7	95.2	93.1	94.7		94.7
28													92.4	90.0	92.2		92.2
29														91.1	96.0		96.0

Notes: p = peasant only
p+np = peasant + non peasant
* refers to USSR-SCR

Table SA2

All grains sown area by regions in mln.hectares from various sources

	NCR	SCR	SPR	CPR	EPR	USSR	USSR -SCR
1. 1916 all	12.08	2.98	27.74	28.28	15.98	87.05	
peas.	11.40	2.91	23.89	26.42	15.94	80.56	
1923	11.01	2.83	20.82	17.85	9.05	61.57	
1924	11.32	2.75	22.41	18.96	10.40	65.83	
1925	11.60	2.65	23.68	20.33	11.87	70.12	
1926	12.11	2.81	26.06	22.09	14.14	77.21	
1927	12.56	2.81	26.64	23.23	15.07	80.31	
2. 1913	9.30		34.10	26.96	16.95		87.31
1916	8.04		29.32	25.00	17.69		80.06
1917	7.87		28.65	25.57	18.15		80.23
1920	5.74		21.61	18.78	15.94		62.07
1921	5.76		21.28	15.03	12.36		54.43
3a.1909/13	9.49		32.88	23.98	17.38		83.74
1916	8.17		29.26	22.21	20.07		79.71
1917	8.29		29.08	22.60	19.87		79.84
1920	6.03		23.14	16.56	17.86		63.59
1921	6.61		22.68	14.87	14.18		58.33
1922	7.29		17.35	13.52	9.50		47.66
3c.1923	7.79		20.64	17.77	10.97		57.23
3b.1920	6.64		22.36	21.01	13.60		63.61
1921	7.38		22.02	18.66	10.25		58.31
1922	8.15		16.77	15.87	6.86		47.65
3c.1923	8.78		20.64	19.58	8.17		57.23
4. 1916	10.29		29.15	30.64	16.01		86.10
1923	10.03		23.19	22.80	10.70		66.72
1924	10.62	3.13	24.57	24.05	12.35	74.72	71.59
1925	10.87		25.95	24.93	13.82		75.57
5. 1924	13.58	3.19	26.63	24.29	14.73	81.82	
1925	13.87	3.04	28.16	25.93	15.37	86.37	
1926	14.26	3.28	30.63	27.69	17.29	93.14	
1927	14.58	3.29	31.07	28.43	18.23	95.60	
6. 1925	14.07	3.63	27.06	26.14	16.25	87.16	
1926	14.42	3.73	29.30	27.67	18.32	93.48	
1927	14.59	3.84	29.65	28.08	19.04	95.20	
1928	13.84	3.94	27.26	28.85	18.56	92.45	
7. 1927	14.29	3.86	30.48	27.64	18.46	94.73	
& 1928	13.42	4.04	27.64	28.27	18.81	92.17	
8a.1929	13.86	4.31	29.20	28.81	19.82	96.01	
9. 1913	13.09	4.56	31.74	29.98	14.99	94.36	
1928	13.50	4.08	27.65	28.31	18.64	92.17	

Sources to table SA1

1. See appendix

2. Osnovniye elementyi Selskogo Khozyaistvo SSSR za 1916 i 1923-27gg. M.1930, pp.14-41.

3. P.I.Popov, Khlebnaya produktsiya Sovetskoi i federirovyemikh s nyeyu Respublik M.1921, p.28

4. Trudy TsSU Tom XVIII, M.1924, pp.122-5.

5. Trudy TsSU, Tom VIII, vyp.4, M.1923, pp.386-89 p.418
Trudy TsSU Tom XVIII, M.1924, pp.122-7

6. Yu.A.Polyakov, Istoricheskiye Zapiski, Tom.74, M.1963, p.113

7. Abrege des donnees statistiques de l'URSS, M.1925, pp.54-61.

8. S.G.Strumilin, Plan.Khoz., 1924, No.4/5, p.167.

9. N.I.Dubenetsky, SO, 1927, no.1, pp.22-3.

10. Ezhegodnik khlebooborota No.1, M.1928, pp.53-5.

11. Statisticheskii Spravochnik SSSR, 1928, M.1929, pp.160-1

12. Narodnoye Khozyaistvo SSSR. M.1932, pp.154-161.

13. Posevniye Ploshchady SSSR, M.1939, pp.15-23.

For sources in table SA2 see appendix.

The data characterising the level of grain sown area may be considered in two parts i) the basic data, the direct results of censuses and surveys of sown area and ii) secondary data providing an indication of the correction coefficients that need to be applied to the basic data.

The first two sections in this chapter are concerned with basic data only. Section a) presents the basic sources of data for evaluating grain sown area in the years 1917 to 1922 and the initial data that were published for these years. Section b) contains an account of the changed method of calculating sown area, the sources of the basic data and the available series of basic (uncorrected) grain sown area data for 1923-27 (the only years for which uncorrected data are available). Section c) describes the early corrections that were applied to the grain sown area data in the period 1920-24 and the conflict over them. It is explained that TsSU wanted to delay the application of specific corrections until the results of its special investigation could allow them to be reliably made. But Gosplan and the government could not afford to wait. Section d) describes the scientific methods that were used in an attempt to evaluate the level of corrections required and describes some of the results. Section e) presents an account of the corrected grain sown area data and attempts to assess the relative importance of the changing correction coefficients and changing indicators of the basic data. Section f) carried out a similar analysis of the corrected data and the effect of the correction coefficients, but does this on a regional basis. Section g) presents the available data on non-peasant grain sown area. These were of relatively minor significance throughout this period. In the concluding section h) I present a general summary and evaluation of the reliability of all these sown area data.

a) Early years, sources and data without corrections 1917-1922

For the first years of this period before the carrying out of the 1920 agricultural census, statisticians had to rely on the results of the 1917 agricultural census. The results of this census were still being worked out in 1918 and were published in a series of works dating from 1919[1]. The following fairly complete listing of the results of the 1917 census, as regards grain sown area, is calculated from a 1924 volume of Trudy TsSU: (See table overleaf).

It will be remembered from section four of part one of this thesis that the 1917 grain sown area was overall 5% lower than the average 1909/13 level and that the highest declines were in the NCR (13%) and the SPR (11%). The CPR had a moderate fall in sown area of 6%, while there had been a 15% increase reported for the EPR.

For 1918 no large scale surveys of sown area were carried out. The department of agricultural censuses/surveys (perepisi) had only just been set up and it was at this time mainly concerned with working out the results of the 1917 census.

In these early years the statisticians were still trying to decide how best to set up a new system of statistical investigations. A special commission on grain statistics meeting after the 2nd All-Russian Congress of Statisticians in 1919, proposed that the local statisticians should, during the year, make four rounds of their volost and that they should collect data from 5% of the households in the volost. The first round was to take place in Spring after the completion of the Spring sowings

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1. Predvaritelniye gubernskiye itogi Vserossiiskoi selskokhozyaistvennoi i pozemelnoi perepisi 1917g.po 29 guberniyam i oblastyam, M.TsSU,1919, Pogubernskiye itogi Vserossiiskoi selskokhozyaistvennoi i pozemelnoi perepisi 1917g. po 52 guberniyam i oblastyam, Trudy TsSU, Tom V, vyp.1 M.1921, Pouezdniye itogi Vserossiiskoi selskokhozyaistvennoi i pozemelnoi perepisi 1917 g. po 57 guberniyam i oblastyam, Trudy TsSU, Tom V, vyp.2, M.1923.

1917 Sown Area *in mln hectare*

	Winter Rye	Winter Wheat	All Winter	Spr. Rye	Spr. Wheat	All Food Grains	Oats	Barley	Millet	Buckwheat	Maize	All Spr. grains	All non food grains	All main grains	All including other grains
1.NCR	4.418	0.030	4.448	0.036	0.130	4.614	2.567	0.720	0.056	0.231	-	3.740	3.574	8.188	8.286
2.SCR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.SPR	4.584	6.271	10.855	0.089	5.166	16.108	2.805	7.408	0.966	0.832	0.962	18.226	12.973	28.687	29.079
4.CPR	9.662	0.301	9.963	0.109	4.654	14.726	5.264	0.536	1.553	0.513	0.011	12.640	7.877	22.602	22.603
5.EPR	3.768	0.011	3.779	0.278	8.450	12.507	5.792	0.774	0.556	0.392	0.001	16.243	7.515	20.022	19.874
All (less SCR)	22.432	6.612	29.044	0.512	18.400	47.956	1.643	9.54	3.13	1.97	0.97	50.952	32.040	79.499	79.842

Source: from Trudy TsSU Tom XVIII, M.1924, pp.122-25.
see appendix for full regionalisation.

Note: There appears to be some slight inaccuracy in the computations for the ECR as the total for all grains including other grains appears to be larger than the all main grains category. The error is however small and would account for less than 2% of the EPR sowings

and was to provide information on both the current and the previous years sown area and numbers of livestock. The second round was to take place at the time of the first threshings of the harvest and was to provide preliminary information on the size of the harvest. The third round was to take place between October and November and was to provide final data on the crop yield. Finally towards the end of Winter a fourth round was to provide information on the year's overall activities and on the level of stocks[1]. This proposal was accepted but later the Collegium of TsSU decided to increase the scale of the investigation by requesting the voluntary correspondents' network to collect data on another 5% of the volost households[2]. And it was also decided to cut down the number of times that these investigations were made. In fact only one such 10% sample investigation was carried out. This occurred from September to October 1919. It was carried out in 34 gubernii but because of the Civil War it was only completed in 22 of these[3]. These gubernii were located primarily in the Northern Consumer Region and the Central Producer Region. Within each province clusters (gnezda) of villages were selected and within these clusters a complete enumeration was carried out. These clusters were chosen in order to give full representation to all the different zones in the gubernia covering the different economic and physical conditions. It was also intended to ensure that over 10% of all the households in the gubernia were covered. In 12 of the gubernii the effect of the Civil War caused the scale of the investigation to be less than 10%. Altogether, over 8.3 million households were surveyed and these contained almost 47 million people.

In the most detailed published source on these materials the data on sown area were given in comparison with the results for the same localities

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1. See V.S.,1919, No.4-7,p.166
2. See V.S.,1919, No.8-12, p.200
3. See Trudy TsSU, Tom VIII, vyp.1, M.1921, p.357.

as recorded in the 1917 census. The results indicated a 14% decline in sown area in these regions for all the main grains:

	1917	1919	% change
All Main Grains	24.699	21.387	-14.4%

The largest decline was in Barley, Wheat and Oats. There was only a slight decline in Rye and a large increase in the minor crops Buckwheat and Millet

	1917	1919	% change
Winter Rye	11.229	10.568	-5.9%
Spring Rye	0.068	0.091	+33.8%
Winter Wheat	0.118	0.087	-26.3%
Spring Wheat	3.892	2.839	-27.1%
Barley	0.941	0.570	-34.3%
Oats	7.459	5.633	-24.5%
Buckwheat	0.298	0.488	+63.8%
Millet	0.694	1.111	+60.1%
All Main Grains*	24.699	21.387	-14.4%

Source: Trudy TsSU, Tom VIII, vyp.1, M.1921, pp.348-49.

Note: These data were given in mlns of desyatiny and have been converted in mlns of hectare.

* All main grains in this case excludes maize, which was quite insignificant in the areas covered by this survey anyway.

In 1920 TsSU carried out its first, and as it turned out its only, full agricultural census. At the time it was proposed to carry out an agricultural census every ten years and to supplement this with the results of sample surveys in between. The census was carried out in September and October 1920, immediately after the demographic census of August 28, 1920. Apart from data on sown area the census provided data on the population, on households, on livestock, on land and on agricultural

inventory. The preliminary results of this census were made available to the 10th Party Congress in March 1921 in a special restricted publication written by the Director of TsSU[1]. More detailed results appeared in the statistical works of TsSU for 1921 and for the following years[2].

The data provided by P.I.Popov in 1921 indicated the following change in sown area, in mln hectare.

	Food grain			Feed grain			All main grain		
	1916	1920		1916	1920		1916	1920	
NCR	5.6	4.9	88.7%	3.8	2.4	67.7%	9.4	7.3	77.7%
SCR	-	-	-	-	-	-	-	-	-
SPR	18.5	14.4	77.6%	10.3	7.0	68.0%	28.8	21.4	74.3%
CPR	22.1	16.5	74.6%	9.1	7.0	76.6%	31.2	23.5	75.3%
EPR	8.0	7.3	97.6%	3.0	2.5	83.4%	11.0	9.8	89.1%
All USSR less SCR	54.1	43.2	79.8%	26.1	18.9	72.4%	80.2	62.1	77.4%

Source: P.I.Popov, ibid., M.1921, p.28.

These are the figures referred to in column three of table SA1 and in source 1 of table SA2. They indicate an overall decline of 23% in comparison with the 1916 level of sown area. The fall was now most pronounced in the SPR and the CPR. In the CPR the fall in food grain sowings was the most serious, while in the SPR it was the fall in sown area of feed grains which was the larger. The NCR had now suffered a quite substantial fall in its sown area, mainly due to a very sharp fall

1. P.I.Popov, Khlebnaya produktsiya Sovetskoi i federiryuyemikh s nyeyu Respublik, M.1921.
2. See Trudy TsSU, Tom VIII, vyp.1, M.1921, pp.278-343, Trudy TsSU, Tom VIII, vyp.3, M.1922, pp.254-85, Itogi Vserossiiskoi Selskokhozyaistvennoi perepisi 1920g., Trudy TsSU, Tom II, vyp.1-8, M.1921-23, Gruppoviye itogi selskokhozyaistvennoi perepisi 1920g. (po guberniyam i raionam), Trudy TsSU, Tom XV, vyp.1a, M.1926, Itogi razrabotki selskokhozyiastvennoi perepisi 1920g. po tipom i gruppam khozyastv., Trudy TsSU, Tom XIV, vyp.1-6, M.1924-6

in the area sown to feed grains (32%), by contrast its fall in sowings of food grains at 11% was quite moderate. The EPR now registered an overall decline in sowings by 11%; again, this was mainly as a consequence of a decline in feed grains (17%) as the fall in sowings of food grains at 3.4% was very small. A more detailed account of the 1917 and 1920 sown areas based on the censuses was published by Kondratiev and Oganovsky[1] but this source gives a very incomplete coverage for 1920. A much better coverage is given in a 1924 volume of Trudy TsSU. This latter source was used in the calculations made below, and these figures are referred to in column 6 of the introductory table, SA1 and source 2 of table SA2:

Overall decline in sown area 1917-1920 from 79.5 - 62.6 mln. hectares by region:

	1917		1920		% change
NCR	8.2	-	6.0	=	-26.3%
SCR			no data		
SPR	28.7	-	23.1	=	-19.3%
CPR	22.6	-	15.6	=	-31.1%
EPR	20.0	-	17.9	=	-10.8%
ALL	79.5	-	62.6	=	-21.3%
by grain:					
Winter Rye	22.432	-	18.709	=	-16.6%
Spring Wheat	18.398	-	14.854	=	-19.3%
Oats	16.478	-	11.342	=	-31.0%
Barley	9.536	-	6.692	=	-29.8%
Winter Wheat	6.612	-	4.412	=	-33.3%
Millet	3.130	-	4.253	=	+35.9%
Buckwheat	1.968	-	1.796	=	-8.7%
Maize	0.978	-	1.137	=	+16.3%
% of all					
Winter Rye	28.2%		29.9%		
Spring Wheat	23.1%		23.7%		
Oats	20.7%		18.1%		
Barley	12.0%		10.7%		
Winter Wheat	8.3%		7.0%		
Millet	3.9%		6.8%		

Source: Trudy TsSU, Tom.XVIII, M.1924, pp.122-5

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1. See Kondratiev and Oganovsky (eds.) ibid., M.1923 pp.102-107, Kondratiev's figures appear in column 4 of table SA1 and as source 4 in table SA2.

The regional changes in sown area are very similar to those given by Popov for 1916-1920, although the change from 1916 to 1917 the use of a slightly different regionalisation[1] indicates a much larger decline in the CPR than in all other regions. Considering the change in importance of the different grains we see a large increase in the sowings of millet and maize, and only a very low decline for buckwheat. These are all grains which have a particularly low seed rate[2] and were consumed by the peasants as groats in hard times. The staple food grain Winter Rye declined far less than the other grains. The sowings of Winter Wheat declined the most, probably because of the peasant's preferance to transfer his sowings of a Winter crop to Rye. There was a particularly sharp fall in the fodder crops barley and oats, indicating that food grains were given priority. Oats and barley were spring grains and so they would be replaced by other spring crops that could be used for food purposes, namely millet, buckwheat, maize and to a lesser spring wheat.

The 1920 census had supplied plenty of detailed data on the size of the 1920 sown area, but as we shall see later there was to be considerable debate over the reliability of these data.

Apart from providing data for immediate requirements the census was intended also to serve as the basis for the future series of sample investigations which were being planned. The census did have some success in laying the basis for a series of clustered dynamic investigations into socio-economic processes in the countryside, but it was much less successful in laying the basis for future annual investigations of the level of sown area. We will consider the dynamic investigations and its uses later,

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1. The main difference in regionalisation is the inclusion of Nizhegorodskaya G. in the CPR instead of the NCR and the transfer of Orenburg G., Perm G., and Chelyabinsk G., to the EPR, where they constitute the separate Urals sub-group. Since the decline in the Urals was less than in the CPR as a whole the removal of these last three gubernii caused the level of decline in the remaining parts of the CPR to fall.

2. See sections on the use of grain as seed.

when we consider the control materials used by TsSU to check the reliability of the sown area data[1].

Here we will consider the role of the 1920 census in future evaluations of sown area.

In the first years of the 1920s the intention had been to calculate the scale of sown area by combining the results of the 1920 census with the results of the regular series of current agricultural investigations. This was similar to the procedure recommended by P.P.Semyonov back in the 1870s (see p.7- above). The department of Current Agricultural Statistics under N.I.Dubenetsky was charged with organising a spring and autumn sample investigation (oprosy), which was to provide several sorts of agricultural data.

The investigation remained a major source of mass data throughout the 1920s. Although the size of the winter sowings was recorded in the autumn investigation, its major concern was with yields and other agricultural elements; and it will therefore be considered later (see p.425 below). Here I will give a brief description of the Spring investigation.

A Spring investigation of peasant households occurred every year from 1921-1929 after the completion of the spring sowings. It was carried out by the local statisticians, workers of the uezd statistical departments or other persons specially sent into the area for this task. The selection of households was made randomly from a list complied by the finance organs for taxation pruposes.

In 1921 the spring investigation covered 30 households in each volost i.e. about 2%. In 1922 it was meant to cover 3% but actually covered slightly less. From 1923-1925 it covered 5% and up to 7½% in places.

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1. See below, p.426

From 1926 to 1929, after it had been decided not to carry out a mid-term agricultural census[1], the coverage was increased to 10%[2]. The spring investigations were to cover among other things, the spring and winter sown area, the extent of winter killings, livestock numbers and the means by which land was worked.

The returns of the spring and winter surveys were sent to Central TsSU for processing. At first data were collected for the previous as well as the current year. From these data coefficients of annual change in sown area were calculated. The 1921 sown area was calculated by applying the 1920-21 coefficients of change to the 1920 sown area as given om the 1920 census. The 1922 sown area was calculated by applying the 1921-22 coefficients of change to the 1921 sown area as calculated above. And so on. This procedure was used in TsSU until late 1923[3]. Sown area calculated in this way for 1920-22 appears in TsSU statistical works until 1924[4]. The data from these sources calculated in this way and without the application of any other additional corrections are given in the following tables and appear in column 5 of the introductory table SA1 and source 3b in table SA2.

	Grain sown area in mln hectares			Grain sown area as % of 1920 sown area		
	1920	1921	1922	1920	1921	1922
NCR	6.64	7.38	8.15	100	111.1	122.7
SCR	-	-	-	-	-	-
SPR	22.36	22.02	16.77	100	98.5	75.0
CPR	21.01	18.66	15.87	100	88.8	75.5
EPR	13.60	10.25	6.86	100	75.4	50.4
All -SCR	63.61	58.31	47.65	100	91.7	74.9

Source: Compiled from Trudy TsSU, Tom VIII,vyp.4,M.1923,pp.386-9.See appendix.

1. See p.335
2. See Vyiborochnoye nablyudeniye v statistikye SSSR,M.1960,pp.125-26.
3. See N.M.Vinogradova,Statistika posevnykh ploshchadvei i urozhayev, in V.E.Den & B.I.Karpenko (eds.) Khozyaistvennaya Statistika SSSR,L.1930,p.63.
4. See Trudy TsSU, Tom VIII,vyp.4,M.1923,pp.386-89,p.419, Trudy TsSU, Tom XVIII,M.1924, pp.122-27, pp.147-48.

These data indicate a relative improvement in the level of sowings of grain in the NCR in contrast with a serious deterioration of the situation in all the consumer regions. Given the low level of the 1920 sowings and the desperation that they caused, the position as indicated by these figures is extremely serious.

As regards the changing proportions of different grains sown the following table indicates the continuation of the trend already observable in the 1920 data. See table below:

	Grain sown area in mln hectares			The sown area of the different grains as a % of all grains		
	1920	1921	1922	1920	1921	1922
Winter Rye	18.709	19.116	18.115	29.4	32.4	38.1
Winter Wheat	4.412	4.296	3.438	6.9	7.3	7.2
Spring Rye	0.394	0.289	0.208	0.6	0.5	0.4
Spring Wheat	14.854	11.233	5.584	23.4	19.0	11.7
All food grains	38.374	35.588	27.345	60.3	60.3	57.4
Oats	11.342	9.763	7.228	17.8	16.6	15.2
Barley	6.692	6.362	3.206	10.5	10.8	6.7
All fodder grains	18.034	16.125	10.434	28.4	27.3	21.89
Millet	4.253	4.346	5.869	6.7	7.4	12.3
Buckwheat	1.796	1.670	1.827	2.8	2.8	3.8
Maize	1.137	1.258	2.194	1.8	2.1	4.6
All groats	7.185	7.274	9.890	11.3	12.4	20.7
ALL	63.593	58.987	47.669	100.0	100.0	100.0

Source: Compiled from Trudy TsSU, Tom VIII vyp.3, M.1923, pp.386-9

There is a continued fall in the share of Barley and Oats and an increase in the share of Rye, Millet, Buckwheat and Maize. By 1922 the

share of groats had risen to over 20%. However we now see a quite distinct decrease in the share of spring wheat as well.

This same series of figures but with a different regional classification appeared in a volume of Trudy TsSU in the following year and here they were accompanied by figures in a similar regionalisation covering the years 1909/13, 1916 and 1917. These figures are referred to in column 5 of the introductory table SA1 and the regional dynamic as given by these figures is presented in the table below:

	Grain sown in mln.hectares						in %% of 1909/13 level					
	1909 /13	1916	1917	1920	1921	1922	1909 /13	1916	1917	1921	1921	1922
NCR	9.49	8.17	8.29	6.03	6.61	7.29	100	86.1	87.4	63.5	69.7	76.8
SCR												
SPR	32.88	29.26	29.08	23.14	22.68	17.36	100	89.0	88.4	70.4	69.0	52.8
CPR	23.99	22.21	22.60	16.56	14.87	13.52	100	92.6	94.2	69.0	62.0	56.4
EPR	17.38	20.07	19.87	17.86	14.18	9.50	100	115.5	114.3	102.8	81.6	54.7
All -SCR	83.74	79.71	79.84	63.59	58.33	47.66	100	95.2	95.3	75.9	69.7	56.9

Source: Trudy TsSU, Tom XVIII,M.1924, pp.122 23 (see appendix)

Here we see that despite the slight improvement in the NCR recorded since 1920, the overall level of sown area still appears 23% below the pre-war level. The position in the major producer areas appears much worse as here the level of sown area appears to be between 43 and 47% lower than the pre-war level.

The most complete series of data for these early years have appeared in the work of a modern Soviet historian citing from the Soviet archives the work of a special commission of NKZem which was set up to evaluate the scale of the decline in sown area as a consequence of the intervention and blockade, The commission produced a series of data which clearly

include the level of corrections applied in the mid 1920s. These data are given in summary in column 9 of the introductory table SA1 and are presented below in more detail:

Sown area of all pre 1939 areas of USSR in mln.hectares.

	1917	1919	1920	1921
Winter Rye	22.214	21.105	19.038	19.327
Spring Rye	0.731	1.016	0.578	0.475
Rye	22.945	22.121	19.816	19.802
Winter Wheat	7.883	7.082	5.272	5.141
Spring Wheat	19.537	15.185	15.763	11.897
Wheat	27.420	22.267	21.035	17.038
All food grains	50.365	44.388	40.851	36.840
Barley	10.462	6.724	7.360	6.929
Oats	16.647	13.215	11.647	10.085
All feed	27.109	19.939	19.007	17.014
Buckwheat	1.995	3.392	1.878	1.772
Millet	3.305	3.840	4.487	4.506
Maize	1.253	1.985	1.582	1.645
All groats	6.553	9.217	7.947	7.923
All grains	84.027	73.544	67.605	61.677
Winter grains	30.097	28.187	24.310	24.468
Spring grains	59.930	45.357	43.295	37.209

Source: Calculated from Yu.A.Polyakov, 'Selskoye Khozyaistvo nakanunye perekhoda k NEP'u', Istoricheshiye Zapiski, Tom.74, M.1963, pp.113,116,118, citing data worked out for the commission for evaluating losses borne by the USSR from the intervention and blockade, located in the archives TsGAORSSSR, F.6764, op.1, d 197, 112, 8.
Unfortunately no regional breakdown was given for these figures.

b) The basic sources and data for 1923-1927 without correction

For the 1923 data a mixed method of calculation was used. For most guberni the results of the sample investigation were applied directly to all the households in the guberni, but in a few, coefficients of annual change were still calculated and applied to the previous year's sowings[1].

These figures should consequently be compared with the earlier figures with a great degree of caution. In fact it is very difficult to compare the 1923 figures with the earlier figures at all. When TsSU presented the 1923 data it presented them alone and not in comparison with the earlier data. And if we attempt to compare them directly with the earlier data published in the 1923 volumes of the Trudy TsSU we discover that the regionalisations have been changed . In presenting these data below, I have readjusted the regions[2] in order to make them more comparable with the regionalisations used for the 1922 data. These figures appear in column 5 of the introductory table SA1 and as sources 36 and 37 in table SA2.

In comparison with the 1922 data in the Trudy TsSU Tom VIII, vyp.4 regions we see the following change in regional grain sown areas in 1923:

	1923 as given	1923 adjusted	1922	1923 indicated change
NCR	7.86	8.78	8.15	+7.7%
SCR				
SPR	19.18	19.18 (20.46)	16.77	+14.4%(+23.1%)
CPR	20.50	19.58	15.87	+23.4%
EPR	8.17	8.17	6.86	+19.1%
USSR -SCR	55.71	55.71 (57.23)	47.65	+16.9%(+20.1%)

Sources: Trudy TsSU, Tom.VIII,vyp.5, M.1924, pp.185-6 (see appendix)
Trudy TsSU, Tom.VIII,vyp.4, M.1923, pp.386-9.

Note: The 1923 regional figures and total exclude maize which was sown on 1.46 mln.hectares, mainly in the SPR. If this sum was added to the SPR sowings the SPR growth rate would rise to 23.1% and the overall growth rate would rise to 20.1% (See figures in brackets).

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1. See Trudy TsSU, Tom VIII, vyp.5, pp.185-6.
2. See appendix.

In comparison with the 1922 data in the Trudy TsSU Tom XVIII the change in sown area looks as follows, in mln hectares

	1923 as given	1923 adjusted	1922	1923 indicated change
NCR	7.86	7.79	7.29	+6.9%
SCR				
SPR	19.18	20.46	17.36	+18.9%
CPR	20.50	17.77	13.52	+31.4%
EPR	8.17	10.97	9.50	+15.5%
USSR -SCR	55.71	57.23	47.66	+20.1%

Sources: Trudy TsSU, Tom VIII, vyp.5, M.1924, pp.185-6
and Trudy TsSU, Tom XVIII, M.1924, pp.122-3.

We see basically the same pattern as in the comparison with the data in the 1923 volume of Trudy TsSU, but with a higher apparent growth in the CPR and a lower apparent level of growth in the EPR.

Both these sets of figures indicate a remarkable improvement in 1923 in the level of grain sowings in all areas, but particularly in the producer areas. But to what extent these figures accurately reflected the real changes in the level of sowings and to what extent they simply reflected the change in procedure for calculating grain sowings is the subject of much uncertainty. But there can be little doubt that the sown area was rising in all areas in 1923, but whether it was rising at the above mentioned rates depends upon whether it had fallen as low as the 1922 figures indicate and this is somewhat uncertain.

Turning now to the 1923 data on sown are by grain we see the following picture:

	1923	1922	1923 indicated change
Winter Rye	22.147	18.115	+22.3%
Spring Rye	0.248	0.208	+19.2%
	22.395	18.323	+22.2%
Winter Wheat	3.578	3.438	+4.1%
Spring Wheat	6.817	5.584	+22.1%
	10.395	9.022	+15.2%
All food grains	32.390	27.345	+19.9%
Barley	5.261	3.205	+64.1%
Oats	9.427	7.228	+30.4%
All fodder grains	14.688	10.434	+40.8%
Maize	1.458	2.194	-44.5%
Buckwheat	2.191	1.827	+19.9%
Millet	5.005	5.869	-14.7%
All groats	8.654	9.890	-12.5%
All grain	57.225	47.669	+20.0%

Source: Trudy TsSU, Tom VIII, vyp.5, M.1924, pp.185-6.
and Trudy TsSU, Tom XVIII, M.1924, pp.122-3
Note: Figures refer to the USSR -SCR

The largest share of the increase in sowings belongs to the fodder grains and there is a decline in the amount of groats sown. These are both strong indications of the beginning of a return to normality.

The change in procedure for calculating sown area that had been partially introduced in 1923 was extended to cover all regions in 1924. For 1924 and for all subsequent years in the 1920s the procedure adopted to evaluate the sown area was to apply the sample survey data directly to the number of households listed in the given area, and to apply

corrections to the resulting figures. The NKFin list of households was normally accepted as the most complete, but even these were analysed in detail and compared with TsSU materials on changes in households. An account of the methods used to correct these results will be given in the following section.

In connection with this change in methodology it was felt necessary to increase the scale of coverage of the spring sample, as was indicated above. It should be pointed out that the statisticians in TsSU, when they agreed to this change in procedure in the autumn of 1923, felt that this would only be a temporary change due to the unusually unfortunate circumstances in which the 1920 census had been carried out.
As early as November 1922 the third All Russian Statistical Congress had called for an increase in the frequency of the series of censuses (including the agricultural censuses) which they now recommended should be carried out every five years with the next one in 1925[1].

In 1925 there was some disagreement within the collegium of TsSU on how the costs of the censuses could be made more economic. Both P.I.Popov and V.G.Mikhailovsky (head of the sector of demographic statistics) were in favour of combining the agricultural with the demographic census. O.A.Kvitkin (Department of Town statistics) argued against this, claiming that such a procedure would only save 1 million rubles and would seriously spoil the quality of the demographic census. The collegium as a whole decided against the combination, but Mikhailovsky insisted on calling a session of IKSS and a full statistical conference to solve the problem[2].

On October 17, 1925 TsSU sent SNK a formal application for a law on the 1926 censuses. After a lengthy delay on December 1, 1925, SNK decided to pass such a law, but on January 5, 1926 it decided to delay

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1. See Byulleten TsSU, 1922, No.70, p.54.
2. See VS., 1924, No.10-12, p.183.

affirmation until it had heard the resolution of the forthcoming Congress of Statisticians (IV[1]. On the same day Popov resigned from the directorship of TsSU[2]. The Congress was held from February 1 to February 10, 1926 and affirmed a fairly large programme of censuses. During the Congress Rykov had visited the statisticians and had suggested that perhaps they were not sufficiently prepared for such a lavish series of censuses[3].

The appointment of V.V.Osinsky to the directorship of TsSU, which was made on February 4, 1926 did not initially change the attitude of the statisticians who continued to press for the census and were insistent that they were ready to carry out all the censuses. The resolution passed by the Congress of Statisticians stated:

> Our work is one of the theoretical ('ideinykh') preconditions of the great Revolution; it must be and it will be one of the most important preconditions for the building of the new social structure in the USSR[4]

Nevertheless the agricultural census was postponed until 1927 and then until 1930 (when it was time for another one anyway) and this was cancelled when TsSU was merged with Gosplan. As explained above, part of the reason why the political leadership felt it could afford to risk the hostility of the statisticians was that they no longer presented such a united front to the authorities.

The work of the statistical congress and TsSU leadership had been attacked by the Gosplan SES statisticians V.G.Groman, N.Vishnevsky and B.G.ukhman in several articles in a new journal belonging to a newly

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1. See SO., 1928, no.2, p.109.
2. SZ, 1926, 3-19, dated 5.1.1926.
3. Izvestiya, February 3, 1926.
4. Izvestiya, February 11, 1926.

formed Society of Marxist-Statisticians[1]. Given Groman's support the authorities could afford to lose Popov, place Osinsky in charge of TsSU, reform TsSU, set up the Expert Soviet and postpone (ultimately cancel) the agricultural census.

The reform of TsSU and the formation of the Expert Soviet did not lead to a change in the sample basis of calculating grain sown area. And this method remained in operation until the abolition of TsSU early in 1930. There were however several important developments in the scale of the production of control materials on the scale of corrections to be applied to the basic data on sown area and I will deal briefly with them in the following section. Here I will present the uncorrected basic data.

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1. See Problemy Statistiki, 1926, no.1, pp.39-48, 49-51, 52-72, 73-77. No.2, pp.40-45.
   The Society of Marxist Statisticians was being organised from the beginning of 1925 although it only received its formal affirmation from NKVD in September 1925. Its preliminary regulations had been affirmed by Glavnauka and the Presidium of the Communist Academy. The editorial Collegium of the journal Problemy Statistiki consisted of Groman, Kritsman, Smit, Strumilin, Khotimskii. See Problemyi Statistiki, 1926, no.1, p.151.

The uncorrected grain sown area data by region
Sown area in mln.hectares

	1916 All	1916 Peasant only	1923	1924	1925	1926	1927
NCR	12.08	11.40	11.01	11.32	11.60	12.11	12.56
SCR	2.98	2.91	2.83	2.75	2.65	2.81	2.81
SPR	27.74	23.89	20.83	22.41	23.68	26.06	26.64
CPR	28.28	26.42	17.85	18.96	20.33	22.09	23.23
EPR	15.98	15.94	9.05	10.40	11.87	14.14	15.07
USSR	87.05	80.56	61.57	65.83	70.12	77.21	80.31
USSR -SCR	84.07	77.65	58.74	63.08	67.47	74.4	77.5

Sown area in % of 1916 peasant sowings

NCR	100	96.6%	99.3%	101.8	106.2	110.2
SCR	100	97.3	94.5	91.1	96.6	96.6
SPR	100	87.2	93.8	99.1	109.1	111.5
CPR	100	67.6	71.8	76.9	83.6	87.9
EPR	100	56.8	65.2	74.5	88.7	94.5
USSR	100	76.4	81.7	87.0	95.8	99.7
USSR -SCR	100	75.6	81.2	86.9	95.8	99.8

Sown area as % of 1916 all sowings

NCR	100	94.4	91.1	93.7	96.6	100.2	104.0
SCR	100	97.7	95.0	92.3	88.9	94.3	94.3
SPR	100	86.1	75.1	80.8	85.4	93.9	96.0
CPR	100	93.4	63.1	67.0	71.9	78.1	82.1
EPR	100	99.7	56.6	65.1	74.3	88.5	94.3
USSR	100	92.5	70.7	75.6	80.6	88.7	92.3
USSR -SCR	100	92.4	69.9	75.0	80.3	88.5	92.2

Source: Osnovniye Elementy Selskogo Khozyaistva SSSR za 1916 i 1923-27 gg., M.1930, pp.14-41.

Before analysing these figures it is interesting to compare their 1916 and 1923 values, with those presented in the early 1920s TsSU series. This comparison is carried out in the table below, in million hectares:

	Early 1920s			Late 1920s data				
				1916			1923/16	1923/16
	1916	1923	1923/16	all	peasant	1923	all	peasant
NCR	8.17	7.79	95.3%	12.08	11.40	11.01	91.1%	96.6%
SCR				2.98	2.91	2.83	95.0%	97.3%
SPR	29.26	20.64	70.5%	27.74	23.89	20.83	75.1%	87.2%
CPR	22.21	17.77	80.0%	28.28	26.42	17.85	63.1%	67.6%
EPR	20.07	10.97	54.7%	15.98	15.94	9.05	56.6%	56.8%
USSR less SCR	79.71	57.23	71.8%	84.07	77.65	58.74	69.9%	75.6%

Source: see tables in text above.

The 1916 census figure referred to in the early 1920s data must have referred to all sown area and not just peasant sown area[1]. The late 1920s uncorrected data therefore gave a slightly larger indication of the 1916-23 decline in the NCR, a much larger indication of the decline in the CPR and a slightly smaller indication of the decline in the SPR and EPR than did the earlier TsSU data. Overall the later 1920s uncorrected data gave an indication of a slightly larger decline in sown area from 1916 to 1923 than that given in the early 1920s data.

Turning now to the post 1923 regional dynamic of grain sown area as indicated by these uncorrected figures we see the following annual growth rates:

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1. This follows from the fact that the 1909/13 sown area certainly covered all sowings, and the 1916 census figure was only 5% lower than it. Consequently if the census figure had excluded 8% non peasant sowings, the total size of the 1916 sown area would have been larger than the 1909/13 area. All authorities agree that it was lower.

Annual growth rates in sown area 1923-27 from uncorrected data.

	1924 /23	1925 /24	1926 /25	1927 /26
NCR	+2.8%	+2.5%	+4.4%	+3.7%
SCR	-2.8%	-3.6%	+6.0%	0.
SPR	+7.6%	+5.7%	+10.1%	+2.2%
CPR	+6.2%	+7.2%	+8.7%	+5.2%
EPR	+14.9%	+14.1%	+19.1%	+6.6%
USSR	+6.9%	+6.5%	+10.1%	+4.0%

Sources: See tables above.

The uncorrected sown area data indicate that there had been some extremely high growth rates in the producer regions before 1926, thereafter the growth rate had fallen somewhat, but was still extremely high. By 1927, according to these data, most regions were approaching the level of 1916 sowings. The NCR and SPR appeared to be substantially above their pre-war levels, but if account is taken of the land earlier sown in non allotment lands the NCR was only 4% above its 1916 level and the SPR was still 4% lower. Since the 1916 NCR level was recorded as being 14% below the pre-war level and all other regions with the exception of the EPR were recorded as being 7-10% lower in 1916 than before the war, it meant that in 1927 the uncorrected data were still indicating a level of sowings at least 10% below the pre-war level. The EPR was an exception and it probably already had 10% more sown area than before the war.

The uncorrected data for the separate grains are indicated in the following table: (see over page).

These figures indicate that the share of rye remained high, but that Wheat and Oats were regaining their earlier share of the total sown land and that the share of millet was falling. These were further signs of a return to normality.

The uncorrected sown area data by grain

	Sown area in mln.hectares						Sown area as % of 1916 peasant sowings					
	A/B 1916	1923	1924	1925	1926	1927	1916	1923	1924	1925	1926	1927
Peasant households(no.)	21.009	22.825	23.459	23,962	24.579	25.016	100	108.6	111.7	114.1	117.0	119.1
Peasant population(no.)	119.160	117.114	119.532	121.794	124.592	127.582	100	18.3	100.3	102.2	104.6	107.1
Winter Rye	22.916 21.513	21.838	22.898	23,342	23.653	23.841	100	101.5	106.4	108.5	109.9	110.8
Spring Rye	0.648 0.635	0.408	0.458	0.457	0.470	0.474	100	64.3	72.1	72.1	74.0	74.6
Rye	23.563 22.148	22.246	23.356	23,799	24.123	24.314	100	100.4	105.5	107.5	108.9	109.8
Winter Wheat	7.719 6.401	4.757	5.376	6.279	7.397	8.982	100	74.3	84.0	98.1	115.6	140.3
Spring Wheat	20.677 19.732	8.967	11.296	12.762	15.847	16.558	100	45.4	57.2	64.7	80.3	83.9
Wheat	28.397 26.132	13.724	16.672	19.042	23.244	25.450	100	52.5	63.8	72.9	88.9	97.7
Barley	10.036 9.198	5.972	5.932	5.210	6.157	5.992	100	64.9	64.5	56.6	66.9	65.1
Oats	16.902 15.456	9.137	10.014	10,108	12.428	14.486	100	59.1	64.8	65.4	80.4	93.7
Maize	1.445 1.354	1.938	1.801	2.694	2.389	2.285	100	143.1	133.0	199.0	176.4	168.8
Buckwheat	2.019 1.922	2.207	2.332	2.559	2.395	2.364	100	114.8	121.3	133.1	124.6	123.0
Millet	3.360 3.145	5.054	4.126	4.819	4.331	3.323	100	160.7	131.2	153.2	137.7	105.7

The uncorrected sown area data by grain (continued)

	Sown area in mln.hectares						Sown area as % of 1916 peasant sowings				
	A/B 1916	1923	1924	1925	1926	1927	1916	1923	1924	1925	1926	1927
Spelt	0.202 0.200	0.057	0.106	0.148	0.217	0.283	100	28.5	53.0	74.0	108.5	141.5
Beans	0.823 0.705	0.940	1.067	1.077	1.171	0.851	100	133.3	151.3	152.8	166.1	120.7
Other grains	0.305 0.294	0.294	0.294	0.225	0.236	0.218	100	100.0	101.7	76.5	80.3	74.1
Grain on allotments	-	-	0.127	0.444	0.543	0.653	100					
All grains	87.052 80.556	61.569	65.831	70.123	77.233	80.307	100	76.4	81.7	87.0	95.9	99.7
All winter grains	30.135 27.914	26.595	28.274	29.621	31.050	32.823	100	95.3	101.3	106.1	111.2	117.6
All spring grains	56.417 52.642	34.974	37.557	40.502	46.183	47.484	100	66.4	71.3	76.9	87.7	90.2
All sown area	97.586 89.607	71.753	77.641	83.521	90.797	95.101	100	80.1	86.6	93.2	101.3	106.1

Source: From Osnovniye Elementy Selskogo Khozyaistva SSSR za 1916 i 1923-1927gg.,M.1930,pp.2-3,23-25.

Note: For 1916 sown area A refers to all sown area - B refers to peasant sowings only. No data are available for grain sown on allotments in 1916 and 19234 Indices are based on the size of peasant sowings in 1916.

c) The early corrections to grain sown area 1920-24

As early as 1921, soon after Popov had announced the size of the 1920 grain sown area as it appeared from the 1920 agricultural census, and had used it to construct a hypothetical grain forage balance for 1920/21, S.G.Strumilin, the director of the newly created Statistical Economics Section of the newly created Gosplan, challenged the reliability of Popov's figures and claimed that a substantial upward correction was needed. Strumilin's challenge was based on an analysis of the available utilisation data and will be discussed in more detail in a later section. The utilisation balance which Strumilin constructed indicated that over a 35% correction was needed to the production data, but it provided no indication as to how this correction should be distributed between sown area and yield.

By 1922, the volume of criticisms of the official TsSU uncorrected sown area data had greatly increased. The deputy NKZem V.V.Osinsky wrote that 'the TsSU data on sowings undoubtedly gave an under-estimation'[1]. And within TsSU many local statistical offices were applying quite substantial corrections to the 1920 sown area results[2].

At the centre TsSU did not deny that its data gave a somewhat underestimated evaluation of reality, but it denied the reliability of any method of correcting it. P.I.Popov the director of TsSU wrote in the official TsSU bulletin in the middle of 1922 that a rough utilisation balance would indicate a level of production some 16% higher than the

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1. This criticism apparently appeared three times within one fairly short pamphlet 'Vosstanovleniye khrestyanskogo khozyaistvo v Rossii i nashi zadachi', which he is reported to have written at the time. The account of this comes from N.M.Vishnevsky, Statistika i Sel. Khoz. dyeistvitelnost, p.8 (This appeared as a special appendix of Sel.i Les.Khoz., No.9-10, 1922, which had its own pagination).

2. Odessa GSB was reported to be applying a correction of 28% to the 1920 sown area figure and 11% to the 1921 figure calculated from it. Bryansk GSB applied a correction of 48%, and the Siberian Statistical Authority applied a 20% correction. See N.M. Vishnevsky, ibid., pp.8-9.

production figures that TsSU was offering and that the production data were probably too low[1]. But Popov refused to be committed as to how much of a correction should be added to the yield data or how much to the sown area data or even the regional location of any needed correction[2]. His attitude was quite simply that the data were insufficiently reliable for estimations of correction coefficients to be made. He consequently preferred to deal with uncorrected data that he suspected were low rather than deal with any arbitrarily adjusted data.

The major criticism of the TsSU data, however, came not from NKZem or from within TsSU but from Gosplan where the data were needed for planning purposes.

It was two recent recruits into Strumilin's sector in Gosplan SES who became the major persistent critics of the TsSU figures. These were the distinguished statistician V.G.Groman and one of his colleagues dating back to their days in the Penza Gubernia zemstvo statistical office, N.M.Vishnevsky.

In an article in Ekonomicheskaya Zhizn in April 1922 Groman proposed that a correction of 22% be made to the 1920 sown area data and 24% to the data for 1921[3]. This implied a 6.8% decline between 1917 and 1920 as opposed to the 21.3% given by uncorrected TsSU figures, and a 17.4% decline between 1917 and 1921 instead of 28.2%[4].

Vishnevsky mentioned these evaluations of Groman's respectfully as 'the first orientational approach to reality', but concludes that even they were somewhat pessimistic in their evaluation of the situation and

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1. See P.I.Popov, Byulleten TsSU, no.57, 1922. Unfortunately I have not been able to get hold of this number of the TsSU bulletin and my account of its contents has to come from Vishnevsky's article (N.M.Vishnevsky, ibid., pp.10-15). Vishnevsky is of course a hostile witness for Popov and so his account should be treated with some caution.
2. He did however admit that large corrections were required to the data coming from the famine regions.
3. V.G.Groman, Neurozhai 1920 i 1921 gg. i ikh vliyaniye na russkoye narodnoye khozyaistvo, in Ekon.Zhizn, no.75, 21/4/1922.
4. see above for the uncorrected TsSU figures.

gave the following series of figures with the much higher corrections as indicated in the table below:

	Vishnevsky corrected in mln.hectares.	TsSU uncorrected in mln. hectares	Correction coefficient
1913	107.59	107.59	0
1916	104.89	90.23	+16.2%
1917	102.27	88.87	+15.1%
1920	94.09	67.87	+38.6%
1921	83.26	59.02	+41.1%

Source: N.M.Vishnevsky, ibid., pp. 6, 68,69.

It will be noted that the effect of Vishnevsky applying a less pessimistic series of higher corrections to all the data from 1916 to 1921 actually increased the 1917-20 decline from Groman's 6.8% to 8% and increased the 1917-20 decline from Groman's 17.4% to 18.6%. Nevertheless in comparison with the uncorrected pre-war data Vishnevsky's data really were less pessimistic than Groman's.

Groman had based his corrections on an analysis of grain utilisation similar to the one published by Strumilin in 1921[1] and so this will be dealt with elsewhere when I consider the utilisation data. Vishnevsky also laid much weight on the results of the utilisation balance but he also attempted to use another method. He attempted to compare the reported size of the arable land in the 1920 census, with the amount of arable land known to exist from other sources. As already mentioned above[2] the general assumption was that the quantity of arable land would not change rapidly from year to year even if part of it did go out of cultivation. By comparing the different evaluations of the size of arable for the same

1. Of course it is quite possible that Groman and Vishnevsky had a hand in helping Strumilin with this early balance.

2. For an account of Vishnevsky's comparison of the 1917 census reports on the size of arable and earlier zemstvo estimates of the size of arable see above p. 219

area, Vishnevsky argued that it should be possible to assess the extent of concealment and under-reporting. Vishnevsky complained bitterly that so few of the detailed results of the 1917 and 1920 censuses of land use (ugodiya) had been published, but from the available data he made the following comparisons:

Changes in the size of arable land between 1917 and 1920 in thousands of desyatina and %%

Gubernia	1917	1920	1920 as % of 1917
Penzenskaya	2087	1586	73%
Pskovskaya	963	765	80%
Kostromskaya	976	547	56%
Bryanskaya	738	598	81%
Tambovskaya	3922	2611	67%
Stavropolskaya	2974	2137	72%
All 7 gubernii	13609	9923	72.9%

Source: N.M.Vishnevsky, ibid., p.25.

Vishnevsky points out that a decline of from 19 to 44% and an average decline of 27% in the size of arable land in just three years was only a statistical phenomenon, having no basis in reality. 'The quantity of arable is not an attribute of a conjuror, a thing which can be something today but nothing tomorrow'[1]. Therefore, he argued that this average 27% decline in arable was really just a consequence of under-estimation and that a similar amount of under-estimation should also be expected in the indications of sown area.

This seems to me to be a rather dubious argument which would certainly require a more detailed analysis of the other categories of land use before it could be accepted. In Russia the pressure of the population

1. See N.M.Vishnevsky, ibid., p.25.

on the land had meant that since Mongol times there had been few examples of total abandonment of arable land. Temporary abandonment was an accepted extensive form of cultivation; consequently it was argued that land which just three years ago had been treated as arable should still be considered as arable even if it had been currently abandoned and was being used as rough pasture. But the problem is that after the agrarian revolution and upsets of the war communism period there was undoubtedly lots of land abandoned in various places and the error of classifying some temporarily abandoned land as pastureland or waste, could quite easily and honestly be made and was a very different kind of error from treating cultivated land as though it did not exist.

In his work Vishnevsky made great play of the fact that the results of his analysis of grain sown area indicated a similar amount of under-estimation as from the analyses of utilisation. I would suggest that the analysis of total arable indications in these seven gubernii should not be considered as confirmation for other data and that the findings of the utilisation balances should be judged on their own merits. This will be done in the next chapter.

Vishnevsky's work was discussed by the statisticians at the third All Russian Congress of Statisticians 3-12 November 1922 . At this session Vishnevsky came in for much criticism from Khryashcheva and Blyakher (the specialists on land utilisation statistics). Vishnevsky's recommended method of using document records of land utilisation to check on the honesty of replies to questionnaires concerning the size of arable, was dismissed on the grounds that the data on land utilisation were not reliable enough.

As regards the general concern felt by Vishnevsky and other Gosplan workers concerning the reliability of the sown area data, Popov agreed that the size of sown area as indicated by the 1920 census was under-estimated

but not to the scale indicated by Vishnevsky. He assured the Congress that TsSU was taking measures to elucidate the scale of the errors and that the results would be published. He also managed to get from Groman, Lositsky and Strumilin a general agreement that it was the task of TsSU to publish statistical material in the form that it was worked out and not to publish it in a corrected form only. However, Lositsky, Strumilin and Groman were insistent that greater care should be taken to indicate the need for a correction and that corrections should be made for sown area and yield separately[1].

The Congress resolved to set up a commission to study the question of grain statistics in more detail and to find a method of improving them and working out scientifically the scale of corrections required. The Commission on grain statistics was set up under T.I.Semyonov and contained most of the specialists on grain statistics.

Less than a week after the Congress had ended the Presidium of Gosplan also discussed the question of sown area statistics[2]. Both Vishnevsky and Popov made speeches. Vishnevsky repeated many of the arguments which had appeared in his earlier articles and at the statisticians congress[3], but he now laid much more emphasis on the utilisation balances than on the arguments concerning the statistics of arable land.

In his speech to the Presidium of Gosplan Vishnevsky was still insistent that high levels of corrections should be made to the grain sown area data:

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1. See V.S. 1922, no.9-12, pp.29-31.
2. This brief account comes from the report that appeared in Ekon.Zhizn, 17/11/1922, and the very brief account of the Presidium's decree on this matter which appears in Protokolyi Prezidiuma Gosplana za 1922 god., Tom,2, kniga 2, M.1979, pp.157-8
3. See above p.346

Year	According to Vishnevsky correction needed to basic data	correction needed to data already corrected by by TsSU	Vishnevsky's recommended figures
pre-war			107.7
1920	25%		94.0
1921	27-30%	+15%	83.1
1922	35%	+20%	70.5

Source: see Ekon.Zhizn, 17/11/1922. It is curious to note that although he is citing the same figures as he cited in his article Vishnevsky receives different correction coefficients.

Popov denied that such a high level of corrections was necessary but was unable to state what level of corrections should be applied to the sown area data.

Popov informed the Presidium that Vishnevsky's arguments had been discredited at the recent congress of statisticians. He agreed that the utilisation data did indicate a higher level of production than did direct survey data, but stated that there was as yet no way of accurately explaining whether this was due to under-estimation of sown area or of yield. He consequently requested Gosplan to be patient and wait until the statisticians had worked out a scientific way of calculating the scale of the error. Strumilin, Groman and finally Krzhizhanovsky all emphasised that the question of the real scale of sowings was so important that something needed to be done urgently. The Presidium therefore ordered Gosplan SES together with TsSU and representatives of NKZem to work together to produce an account of an accurate account of the scale of sown area and yield. The decree concluded by proposing that 'the Economics Statistics Sector work out all its calculations about production and all its statistical work in full contact with TsSU'[1].

1. See Protokoly% prezidiuma Gosplana za 1922 god.,Tom 2, kniga 2, M.1979, p.158.

The hoped for cooperation between Gosplan and TsSU does not appear to have materialised and the feuds continued. The statisticians did however make some changes in their procedure for calculating sown area and did offer some overall corrections to the level of grain production.

At the next All Russian Statistical Conference in January 1923 there was again much discussion concerning the reliability of grain statistics. And one of the most popular and influential local statisticians G.I.Baskin[1] criticised the way in which the sown area statistics were worked out. He argued that in asking for the current and past years sown area and using them to calculate coefficients of change the statisticians were getting an attenuated picture of peasant deception. He argued that the peasants tended to under-estimate the current year's sowings and over estimate the previous year's sowings. Baskin consequently recommended that the data be used directly in the calculation of sown area[2]. The proposals were accepted by TsSU at the time.

This change in methodology concerning the evaluation of sown area and the adoption of the half point correction to yield[3], both occurred early in 1923, and in July 1923 TsSU formally offered a correction to its evaluations of the 1920-23 grain harvests[4]. But the correction was only made to the production figure. TsSU continued to refuse to offer any separate correction for sown area data. In November 1923 when Dubenetsky announced the beginning of the improvement in sown area figures he used exclusively uncorrected data and never once mentioned the need of any corrections[5].

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1. At the third All Russian Statistical Congress in November 1922, Baskin had received more votes than anyone else in his election to the executive committee of the statistical congress. (See V.S. 1922, no.9-12, p.15).
2. See V.S., 1923, no.1-3, p.297.
3. See later pp 410-2
4. See V.S., 1923, no.7-12, p.182 and see later p.477
5. See N.Dubenetsky, Razmer posevnyikh ploshchadei v 1923, in EO.,1923, no.11, pp.48-52.

The Semyonov Commission had come to a conclusion concerning the reliability of grain statistics about this time in November 1923, but there was little that it found to say concerning the reliability of the sown area data, other than to record its uncertainty.

The commission explained that the procedure for calculating sown area had been changed from the indirect method of calculating coefficients of change and applying them to the 1920 census data, to a more direct method of applying the results of the sample investigation directly to all peasant households in line with Baskin's proposal. The commission explained that the change had been needed a) because the extreme changes in the level of sown area from 1920 to 1921 had made the earlier method less reliable and b) because of the uncertainty over the possible under-estimation involved in the 1920 census. But as regards the reliability of the figures which were currently being calculated, the commission could apparently not even agree whether they should be inflated upwards or downwards. 'Theoretical difficulties in selecting households to investigate would lead to a tendency to over-estimate the level of sown area. But the population itself would tend to under-estimate it. Without a special study it is not possible to know which tendency predominates'[1].

A few months later, early in 1924, Dubenetsky, writing in a personal capacity, was able to reveal that the Semyonov commission considered that an overall correction of 13% was necessary to the basic production data and that this should be divided between sown are and yield in such a

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1. See V.S., 1924, no.1-3, p.175.

manner that sown area received a correction of 7% and yield of 6%[1].

By 1924 the pressure must have been mounting for the statisticians to make, at last, specific corrections to their data. The material conditions for making an improved evaluation were getting better. While agriculture had been in a condition of crisis with levels of sowings falling and with peasant hostility increasing, the task of getting any reliable statistical data was bound to have been extremely difficult. But once the recovery had begun and the peasants' confidence in the NEP had begun to grow, then the task of getting more reliable data and ascertaining the reliability of the mass data became much easier. The deliberations of the Semyonov Commission now stood a chance of coming up with major improvements. But the statisticians still appeared to be showing great reluctance to making these corrections. The volumes of Trudy TsSU which were published in 1924 still presented the sown area data without any correction[2]. And the planners were getting increasingly desperate.

It was at this point that the planners received a great impetus as Stalin made his intervention and publicly criticised the statisticians for hindering planning work[3].

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1. See N.I.Dubenetsky, K voprosu o tempe vozrozhdeniya sel.khoz. SSSR, in EO., 1924, no.2, p.24. This article was written in a personal capacity by Dubenetsky as a reply to a rather misguided article written by the NKZem expert N.P.Oganovsky. (Temp vozrozhdeniya sel.khoz. SSSR in EO., 1923, no.11, pp.15-20). In his initial article Oganovsky had sided with TsSU's critics in Gosplan and had added that the NKFin data on sown area showed a sharper rate of recovery than the uncorrected TsSU data. Dubenetsky pointed out that the NKFin data were no new source of data as Oganovsky was implying but were just part of the data which TsSU based its accounts upon. These data were in fact part of the least reliable part of the TsSU data, and it was quite likely that the appearance of a higher than average recovery was partly due to a sharp decrease in peasant concealments.
2. We shall see in the next chapter that a half point correction to the yield data had now been accepted in these data (see below p.410-2).
3. See above p.308

In May 1924, immediately in the wake of Stalin's criticisms Strumilin launched his famous (much reprinted) attack on TsSU's grain statistics in his article 'Towards the reform of harvest statistics'[1]. In this article Strumilin claimed that TsSU were currently accepting corrections of over 50% to the basic grain production data which was only about half the size of correction which they were, according to Strumilin, applying to the grain yield data at this time[2]. In comparison with these alleged TsSU corrections Strumilin also cited, in the article the level of Gosplan SES recommended corrections[3]. By contrast Gosplan SES recommended a higher level of correction to the sown area data than to the yield data. The Gosplan SES corrected grain yield data were consequently somewhat lower than the alleged TsSU corrected yield data, and overall (with the exception of 1921) the production levels were much higher. Gosplan corrected sown area data, the alleged TsSU corrected sown area data and the uncorrected data are presented in the following table, *mln hectares:*

	Uncorrected sown area	'TsSU' corrected sown area	Gosplan corrected sown area	Corrected data in %% of uncorrected data 'TsSU'	Gosplan
1906/14	81.98	?	89.41	?	+9%
1913	87.33	?	95.20	?	+9%
1920	63.61	73.78	81.54	+16%	+28%
1921	58.37	67.77	73.01	+16%	+25%
1922	47.65	55.09	63.94	+16%	+34%
1923	56.62	65.91	75.96	+16%	+34%

Source: S.G.Strumilin, Plan.Khoz., 1924, no.4/5, p.167.
Note: These data refer to the 7 main grains in the pre-1939 area of the USSR less Transcaucasia, Turkestan and the Far East

1. S.G.Strumilin, 'K reformye urozhainoi statistiki', EO, 1924, no. 9-10, Plan.Khoz.,1924, no.4-5. Later reprinted with some modification in Na khozyaistvennom frontye, M.1928 and M.1959, in Statisticheskoe Ekonomicheskiye Ocherki, M.1958, and in Vol.1, of his Izbranniye proizvedeniya, M.1963.
2. See below p.450-8 for an account of corrections to yield data at this time.
3. These were dropped from later reprints of this article.

I have not been able to find any TsSU series of grain sown area figures published before this date which correspond to the magnitudes given in Strumilin's table. The correction of up to 16% which Popov had earlier mentioned[1] referred to both sown area and yield. The only indication of a separate TsSU sown area correction that I have come across was Dubenetsky's remark in February 1924, that the TsSU special grain commission considered that a 7% correction be made to sown area data[2]. However, after this date we do see TsSU beginning (although very reluctantly) to apply corrections of about 16% to sown area.

In his article Strumilin had virtually given the statisticians only two options: to defend the level of a 16% correction which he had ascribed to them or to accept the Gosplan recommendation of a 34% correction. Faced with these options and the strong political support that Strumilin appears to have got behind him, TsSU very reluctantly appears to have settled for 16%. In the following years many separate control investigations were carried out in an attempt to find a scientific basis to justify the application of a large correction and these will be dealt with in the next section of this chapter. But there can be little doubt that at the time when TsSU were forced to accept this 16% level of correction to sown area, they were doing so most reluctantly.

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1. See above, pp. 343-4
2. See above, p. 352

d) Sources of data for making corrections to the sown area data

N.I.Dubenetsky was in charge of the TsSU department of current agricultural statistics and it was initially his responsibility to check on the reliability of the data which his department was receiving. In the early 1920s he had repeatedly opposed the alternative series of figures which Gosplan was producing and until forced to give way to the authority of the Expert Soviet he had been an outspoken critic of the way in which Gosplan was correcting his data. In 1923 when TsSU had changed its method of calculating grain sown area, Strumilin in Gosplan was quick to claim that this change was a consequence of the adoption by TsSU of the Gosplan balance (i.e. utilisation) method. Dubenetsky was quick to respond that it was no such thing and that TsSU had come to its own conclusions on the need for a change[1].

According to a speech which Dubenetsky later made to the Collegium

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1. See N.I.Dubenetsky, Ekon.Obozr.,1924, no.8, pp.37-8.
For a more lengthy discussion of this question and the general politics between TsSU and Gosplan see S.G.Wheatcroft, ibid., Birmingham 1974.

of TsSU, by 1922 and 1923 many GSB had carried out their own controlled investigations of the real size of sown area in comparison with the size indicated in the spring investigations. Dubenetsky reports that in areas where taxation was based on the total arable area the spring surveys were shown to give an under-estimation of 15% while in those areas where taxation was based on sown area the level of underestimation was seen to be even higher at 20%[1].

Dubenetsky claimed that it was the results of these local control investigations that had demonstrated the need for a change in the procedure for calculating sown area and for the introduction after 1923 of quite substantial corrections to the sown area data. But once it became accepted that large corrections were necessary, it also became essential for scientific methods to be worked out to calculate the scale of correction that was deemed to be necessary. The method generally accepted was to carry out a detailed control investigation and to compare the results of the detailed control investigation with the results of the mass data.

Two types of control work were generally used to correct sown area data. First, control investigations were made of the representativeness of the sample of households used in the mass surveys. And, more importantly, control investigations were also used to ascertain the level of concealment and under-reporting which was going on.

The representativeness of the investigated household was checked by examining those sample households which fell within the coverage of the clustered dynamic investigation and by comparing the representativeness (by sown area, livestock level, income) of all these households with the overall results of the dynamic census. Since the dynamic survey was

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1. See Report of speech of N.I.Dubenetsky to Collegium of TsSU on 26/1/1925 as reported in Byulleten TsSU, 1925, no.2 p.79.

carried out by more experienced statisticians[1] the data received from it were assumed to be more exact. Sometimes the representativeness of the sample was also checked against the full tax accounts[2]. Once a 10% coverage had been reached in the size of the spring survey (i.e. from 1926) there were few problems concerning representativeness. The more important problem was that concerning the overall levels of sown area recorded in the surveys. And as we shall see quite considerable corrections were applied to these results.

The main sources of control materials for the overall level of sown area were: Budget studies, and control measurements (the latter included aerial photography as well as normal survey work).

Budget studies of individual peasant households had been collected by Litoshenko's department in TsSU, ever since its creation in 1918. These studies provided important control materials for sown area and yield evaluations, basic materials for the study of utilisation, and also basic materials to study changes in peasant incomes (overall and for different socio-economic groups).

There were several different types of budget investigation of peasant households. These different investigations were carried out in different ways over different periods and with several different purposes. These are explained in more detail in the appendix

Budget studies were first used to check against the spring investigation data for the 1924 survey results. The procedure was to examine the sown area of those individual households which were covered both by the spring investigation and by the budget investigations. Since at this time the budget studies covered about 10,000 households (0.04% of all

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1. These were the statisticians attached to the Department of Agricultural Survey (Perepis) Statistics of GSB and not the local volost statisticians.
2. See Vyiborochnoye nablyudeniye v statistikye SSSR, M.1966, pp.126-7 for a more detailed explanation of how the representativeness of the sample was checked at this time.

households) and the spring investigation covered about 5% of all households), the number of randomly selected households covered by both surveys could be expected to be about 500, about 0.002%. This is clearly not a very large sample upon which to base very large correction coefficients, but Obukhov explains that this was almost the only basis for the corrections which the Expert Soviet made to the 1924 data. The size of these corrections were as follows:

Percentage correction made to Spring Investigation data on the basis of comparisons with the data of the budget investigations in 1924.

Region	All crops	Grains
1. NCR	24.1%	17.8%
2. SCR		
3. SPR		
4. CPR		
Central Agricultural R.	16.3%	14.7%
Volga Region	30.0%	27.4%
Volga-Kamskii R.	19.3%	20.0%
5. EPR		
Uralsk.Oblast	28.4%	28.4%
Zapadnaya Sibir	42.3%	40.7%
Vostochnaya Sibir	20.3%	18.3%

Source: The theses of V.M.Obukhov's report on the degree of reliability of mass statistical materials given to the Sector on Agricultural Statistics of an All Union Statistical Conference held in January-February 1927, (Vsesoyuznoye Statisticheskoye Soveshchaniye 25 yanvarya - 3 fevralya 1927g.,Tezisy dokladov po sektoru selsko-khozyaistvennoi statistiki, M.1927, pp.73-4.

No mention is made of any attempts to gauge the representativeness of those 500 odd households which had served as the basis for these corrections. If they had been truly randomly selected they might have been fairly representative but their number remains very small. The increase to a 10% spring investigation in 1926 would haveled to a slight increase of up to 1000 households 0.004% covered.

The reason for accepting the results of the budget investigation as being more reliable than those of the spring investigation were that the budget investigations were carried out more carefully and more slowly (in 2-3 days) and by more qualified personnel. Apart from this, budget studies data on sown areas were accompanied by a budget investigation using the balancing method (i.e. checking production against utilisation). It was therefore more difficult to underestimate either sown area or yield[1].

In 1926 the scale of comparisons was greatly increased when the budget [illegible] sown area data were compared with the results for the same households given in the full tax accounts as well as in the spring investigation. The results from this survey for 1925 sown area are given below for the few regions for which data were given:

	Spring invest.	Budget/ Spring invest.	Tax data	Budget/ tax data
Consumer Region	100	114	85.8	132.9
Central Agricultural Region	100	113.5	94.9	119.6
Ukraine	100	107.9	91.3	118.2

Source: Computed from V.M.Obukhov, in Vsesoyuznoye Statisticheskoye Soveshchaniye....M.1927, p.75.

The tax data uncorrected gave a level of sown area in these regions from 5-15% below the uncorrected Spring investigation data. But when corrected by adjusting with a correction coefficient derived from a comparison with the budget data figures for the same households, the corrected spring investigation data were from 8-14% higher than the uncorrected spring investigation data and 18-33% higher than the uncorrected tax data

1. See V.M.Obukhov in Vsesoyuznoye Statisticheskoye Soveshchaniye... M.1927, p.73 and V.M.Obukhov, Popravki k posevnyim ploshchadyam 1925g. in S.O. 1928, no.5, p.8.

The major defects with using budget comparisons were the delay in receiving data and the problems of getting precise regional differentiation. Since the budget data were only collected in the year after the harvest, there was no possibility of using these data for early evaluations. And since there were so relatively few budget studies that covered the spring investigation sample it was very unsafe to restrict their number even more by attempting to apply them to small regional areas. In order to overcome these problems other control devices were introduced. These other control devices also had the advantage of giving an indication of the reliability of the budget studies data.

Strict control surveys were first introduced in the Caucasus in 1925, in the Urals, in Stalingrad and in parts of the Ukraine in 1926, and on a much wider scale in 1927. In 1928 the decision appears to have been made to carry out control surveys in virtually all major economic areas even though this would mean a lower overall area covered[1]. The following table (see over page) indicates the expansion of the coverage of control surveys in these years.

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1. See D.Bogolyubskii, 'Obmeryi i aerofotosyemka posevnyikh ploshchadyei v 1928g', S.O. 1928, no.9, p.105.

The regional coverage of controlled surveys

	1925		1926		1927		1928	
	in th. hectares	as % of all sown area	in th. hectares	as % of all sown area	in th. hectares	as % of all sown area	in th. hectares	as % of all sown area
1. NCR								
Leningrad Ob.					20.3	1.05	25.3	1.31
Tsent.Prom Ob.							88.0	1.07
2. SCR								
3. SPR								
Uk.SSR			11.0	0.05	84.6	0.40	-	-
Krym ASSR					19.7	3.02	-	-
Sev Kavkaz kr.	249.9	3.65			506.2	6.04		
4. CPR								
Cent.Chernozem							160.0	2.24
Nizhne Volzhsk			35.0	0.71	116.7	2.41	60.0	1.24
Sredne Volzhsk					128.6	1.61	30.0	0.37
Bashkir ASSR					35.3	1.83	-	-
Vyalko Kamsk.							30.0	1.55
5. EPR								
Urals			153.0	3.16			-	-
Sib Krai					75.2	1.16	50.0	0.77
Kazak SSR					41.5	1.76	40.0	1.22
All USSR	249.9	0.3	199.0	0.22	1028.2	1.08	483.3	0.51

Source: See O.D.Bogolyubskii, 'Obmeryi i aerotosyemku posevnyikh ploshchadyii, v 1928g.', S.O. 1928, no.9, p.105.

The scale of corrections claimed as being needed by these control surveys (for 1925 and 1926) indicated that the budget investigations were underestimating sown area by from 1 - 10% as is indicated in the following table:

	Number of house-holds	budget data	control measures	Control measure/ Budget data
North Steppe Okr. N.Caucasus	119	13.3	21.4	7.2
S.Steppe Okr.	182	19.2	28.6	7.9
Saural	204	14.7	25.9	9.8
Gornozavodskii Ural	77	32.7	38.7	4.5
Predural	101	32.8	34.5	1.3
Stalingrad Gub.	87	29.8	38.0	6.3

Source: V.M.Obukhov, ibid., S.O. 1928, no.5, p.14.

From the above relationships it was possible to establish the general relationship between budget correction and the control measurements corrections; this was given as[1]:

$$p = 1.42171 - 0.00290z$$

where p = additional correction for underestimation of budget data

z = correction to spring investigation data as indicated by budget data.

Obukhov himself points out that the weakness of this additional correction procedure is that the control measures for 1925 and 1926 on which it is based, covered a very small part of the sown area (and not total arable) and that it covered areas which were very irregularly cropped and used irregular and extensive cropping systems. The latter two facts meant that there was

1. See V.M.Obukhov, ibid., S.O., 1928, no.5, p.14.

a relatively high incentive to conceal sown area and that it was relatively easy to do so. Obukhov therefore argued that it would be very unwise to attempt to extend the coverage of this correction to areas where taxation was levied according to the arable area and where the three field rotation system was more prevalent i.e. where both the incentive for and the possibility of concealment were less. Obukhov consequently recommended that the full control measurement additional correction should be applied only in certain appropriate areas and that only a fraction of it should be applied in other areas. After the carrying out of control surveys in other areas in 1927 and 1928 it would have been possible for a more scientific procedure to be devised to assess the additional corrections in these other areas. We have few details of what actually happened. The correction coefficients worked out on the above methodology and accepted by the Expert Council in 1927 and 1928 are given in the following section.

At the Special Conference on the question of grain forage balances from May 28 to June 2, 1929, Obukhov expressed his great distrust of control surveys as a method of testing the validity of sown area data and he recommended the greater use of aerial photography. He also recommended the application of a much lower correction to sown area data in 1929/30, pointing out that the spread of contractual agreements (Kontraktatsiya)had led to a tendency for the peasant to exaggerate the growth of his sown area. The appearance of rapid growth could easily be achieved by the peasant who just had to reveal some of the land which had earlier been concealed. If the statisticians did not pay attention to this likely phenomenon,warned Obukhov, and if they did not lower the level of correction which they traditionally applied to offset peasant concealments, then they would get a totally artificial statistical indication of growth[1].

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1. See S.i N.K., 1929, no.7, p.154.

Very few indications are available of the scale of corrections applied to the basic data after 1927. There appears to have been a decision made not to publish any of these data. When Gayster published the series of uncorrected TsSU sown area data in 1930 he only included the figures up to 1927, even though data for later years must have been available[1]. This lack of published data is probably related to the great political arguments that we know were taking place in TsSU throughout 1928 and 1929[2]. The only direct indication of the size of correction coefficients that TsSU were applying to raw sown area figures comes from the NKFin tax data which were published in 1931[3]. In this work the NKFin tax data on total sown area were compared with the corrected TsSU data in order to indicate the level of concealment that was believed to be taking place. According to these data the degree of concealment had been dropping steadily through the 1920s and had dropped significantly after 1927:

The % of underestimation of sown area in tax data according to TsSU data

	in%	change in level of under-estimation
1924/25	27.7%	
1925/26	24.4%	-3.3 percentage points
1926/27	20.1%	-4.3
1927/28	18.2%	-1.9
1928/29	11.4%	-6.8

Source: Sel.Khoz. SSSR v 1928/29 g..., M.1931, p.vii.

As we shall see later in the next section the results of such a large level of decline in correction coefficient were very serious and if the TsSU Expert Soviet had attempted to reduce the correction coefficient even further in 1929, then the subsequent political conflict becomes much more understandable.

1. See above p. 2 for an account of these data
2. See below pp311-2 for a discussion of the conflict over grain production evaluation between the political leadership and Osinsky in 1928, and Groman in 1929.
3. See Selskoye khozyaistvo SSSR v 1928/29 godu po dannyim nalogovykh svodok po edinomu selkhoznalogu, M.1931, p.vii.

e) The corrected grain sown area data and the effect of the corrections

I have described above how reluctant TsSU had been to apply specific corrections to their grain sown area data, and how they had been virtually forced into it by the repeated attacks from Gosplan, some of the NKZem workers and by condemnation by the political leadership. TsSU did not give way immediately to this criticism. Throughout 1924 it continued to publish uncorrected figures and only at the end of the year in a major article in the introduction to the end of year issue of Ekonomicheskoye Obozreniye, do we see signs that Popov has accepted some specific corrections to the sown area data[1]. The figures in his article are not given specifically for grain sown area, but for the sown area for all crops and they indicate the Popov was applying a correction of about 9.4% to the 1916 data, 15.2-16.2% to 1920, 16-17.4% to 1921, 16.9-19% to 1922 and 13.3% to 1923 data.

In the following table I have compared Popov's data for all crop sown area with comparable uncorrected data in order to demonstrate the extent of the corrections that were applied. I have also calculated what share of the overall dynamic was a direct consequent of the change in the level of correction coefficient and how much was a consequence of the indications in the raw data. (See table over page).

This table indicates that the effect of the correction coefficients was to increase the 1920 level of sowings in comparison with the 1916 level by 6%, to decrease the annual level of decline from 1920 to 1922 by 1% and to decrease the 1923/22 growth by 2%. Until 1922 the size of the correction coefficient was increasing, but after 1922 as the peasants began to regain confidence in NEP and to some extent also the authorities, their level of concealment is assumed to have fallen and with it also fell the

1. P.I. Popov, EO 1924, no 23/24, pp

The dynamic of the sowings of all crops in the USSR less SCR in million hectares 1916-1924, the level of corrections applied to the data and the contribution of the changing level of corrections to the final dynamic.

	Sown area in mln.hectare						% change in sown area				
	1916	1920	1921	1922	1923	1924	1920/ 1916	1921/ 1920	1922/ 1921	1923/ 1922	1924/ 1923
Popov's corrected data	94.53	79.96	74.81	64.13	76.43	82.93	0.85	0.94	0.86	1.19	1.09
Uncorrected data (i)	86.47	68.81	63.71	53.88			0.80	0.93	0.85		
(ii)		69.4	64.51	54.87	67.45			0.93	0.85	1.23	1.07
(iii)	93.46[a] 85.62[b]				68.19	74.16					
Correction coefficients data (i)	1.093	1.162	1.174	1.190			1.06	1.01	1.01		
(ii)		1.152	1.160	1.169	1.133			1.01	1.01	0.97	
(iii)	1.011[a] 1.104[b]				1.121	1.118					1.00

Sources: calculated from data in P.I.Popov, EO, 1924, no.23/24 p.LXX
and i) Trudy TsSU, Tom XVIII, M.1924, p.122
ii) Trudy TsSU, Tom VIII, vyp.5, M.1924, p.185-6
iii) Osnovniye elementy ... M.1930, p.23.

Notes: a) refers to all sowings
b) refers to peasant sowings only

level of correction needed to offset it.

At this time grain accounted for from 89-93% of all crops sown, consequently the level of corrections applied to all crops sown area must be very similar to that required for all grains.

The first TsSU series which explicitly involved corrections to grain sown area figures was a series that was published in the following year (See summary table SA1 line 7). If we carry out the same kind of operation on these figures to uncover the size of correction applied for different years and the contribution of these correction coefficients to the final dynamic of grain sown area levels we get the following picture:

	1916	1923	1924	1925	1923/ 1916	1924/ 1923	1925/ 1924
1925 corrected data	86.10	66.72	71.59	75.57	0.77	1.07	1.06
uncorrected data	84.08[a] 77.65[b]	58.74	63.08	67.47	0.7[a] 0.76[b]	1.07	1.07
correction coefficients	1.024[a] 1.109[b]	1.136	1.135	1.120	1.11[a] 1.02[b]	1.00	0.99

Sources: calculated from data in
Abrege des donnees statistiques de l'URSS, M.1925, pp.54-61,
and uncorrected data in Osnovniye elementy... M.1930 p.213

Notes: a) refers to all sowings
b) to peasant sowings only.

Here we see that the correction coefficients make a negligible contribution to the dynamic of growth and that the reduction in the size of correction coefficient from 13.5% in 1924 to 12% in 1925 results in a slight deflation (by 1%) in the sown area growth rate. Again we see a declining trend in the level of corrections applied. We should however notice that despite this downward trend the actual level of corrections

The decline in the level of correction coefficients resulted in the growth in the level of sown area as registered in the uncorrected data falling by a third from 9.2% to 5.7%.

The following year V.M.Obukhov announced that the level of corrections to be applied to the basic spring survey data on grain sown area had been further increased to 23.2% in 1925, 20.5% in 1926 and 19.0% in 1927[1]. This is the same magnitude of corrections that we receive when we attempt to calculate the correction coefficients by comparing the contemporary expert council corrected grain sown area figures with Gayster's uncorrected data (see also summary table SA1 *columns 10 and 2*):

	1924	1925	1926	1927	1925/ 1924	1926/ 1925	1927/ 1926
Expert Soviet corrected data	81.82	86.37	93.14	95.60	1.06	1.08	1.03
uncorrected data	65.83	70.12	77.23	80.31	1.07	1.10	1.04
correction coefficient	1.243	1.232	1.206	1.190	0.99	0.98	0.99

Sources: corrected data from Ezhegodnik Khlebnoi Torgovly. No.1, M.1928, chast, p.83.

uncorrected data from Osnovniye elementy ...M.1930, pp. *213*

We see that the level of corrections is continuing to rise despite *their* downward facing trend. But we also note that the steps in this downward trend are becoming less distinct. In the 1927 data cited above the level of the correction coefficient fell by 3.9 percentage points between 1925 and 1926, but in the above data it is only falling 2.6 percentage points between 1927 and 1926. As the escalator continues upwards we find

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1. Obukhov, still formally head of TsSU's Institute of Scientific Methodology, appears to have taken over Dubenetsky's role as chief spokesman for the Expert Soviet at this time.

that in 1928 a correction coefficient of 19% was being given to the 1927 data whereas in 1927 only an 18.2% correction was given to the 1926 data.

In 1929 a further series of sown area data appeared, covering the years 1925-28. These are referred to in column "1" of the introductory table SA1. These figures indicate the great setback that there had been in sown area in 1928. In 1928 the steady growth in sown area which had occurred since 1922 was turned into a decline. The problem was primarily due to the extremely rare, harsh winter conditions which caused the destruction of a large share of the winter crop and delayed the spring sowings[1]. Since the sown area figures refer to the area harvested and not just the area sown, the destruction of the crop resulted in the decline in the indication of sown area. This was particularly severe in the SPR and for the Winter grains.

Whereas earlier the statistician's problem had been one of fitting a falling level of correction into a rising indicator of sown area, now the problem was of what form of correction to apply to falling basic indications of sown area.

The following table indicates the corrected regional sown area data for 1925 to 1928, the changes in sown area, the correction coefficients and the amount of growth or decline caused simply by the change in the level of correction coefficients:(See also summary table SA1 column 11).

	1925	1926	1927	1928	1926/ 1925	1927/ 1926	1928/ 1927
corrected data	87.16	93.48	95.20	92.45	1.07	1.02	0.97
uncorrected data	70.12	77.23	80.31	?	1.10	1.04	?
correction coefficient	1.243	1.210	1.185	?	0.97	0.98	?

Sources: corrected data Statisticheskii Spravochnik SSSR za 1928 M.1929, pp.160-1
uncorrected data from Osnovniye elementvi.... M.1930, pp.146-1

1. See S.G.Wheatcroft, SIPS no.13.Birmingham.1978.

The levels of the 1925 and 1926 correction coefficients had been increased as had happened in all earlier years but curiously the level of the correction applied to the 1927 data had been decreased slightly from 19% to 18.5%. This had the effect of reducing the 1927/26 growth in sown area by a third (one percentage point in three). To what extent the observed decline in sown area from 1927 to 1928 was the result of a decline in the indications received from the spring investigation and to what extent it was the result of a change in the level of correction coefficients is unknown. But if there had been a change in magnitude of the correction coefficients in the order of that indicated in the taxation data[1] then it is conceivable that the entire appearance of a decline in grain sown area in 1928 was a consequence of the change in level of correction coefficients and that the uncorrected raw data probably indicated a continued rise in sown area.

To demonstrate this possibility I will return to the NKFin taxation data figures for all sown area in 1927 and 1928 and their comparisons with the corrected TsSU data. These figures indicate the relative importance of changes in taxation department data and changes in TsSU correction coefficients on the 1928 decline in sown area for all crops:

	1927	1928	1928/1927
TsSU corrected data	112.79	109.86	0.974
Tax Dept. uncorrected data	92.96	97.36	1.055
correction coefficients	1.222	1.124	0.924

Sources: Selskoye khozyaistvo SSSR v 1928/29g...,M.1931, pp.vi, vii.

Note: The tax department data are given on p.vi for both years The TsSU corrected data for 1928 are given on p.vii, and the correction coefficients for 1927 and 1928 are also given on p.vii. The TsSU figure for 1927 was calculated from the tax department figure for 1927 and the appropriate correction coefficient.

1. See above p.364

This table shows that the raw tax department data indicated a growth in all sown area by 5.5% from 1927 to 1928, but the large reduction in TsSU corrections at this time (from 22.2% to 12.9%) would have caused the apparent growth to be converted into an apparent decline.

As has been pointed out above[1] the taxation department's data were nothing separate from the normal TsSU data, they were just part of it. Presumably a copy of that part of the spring investigation that was carried out by the local statisticians would have been handed over to the local taxation department and would have been the main source for the tax department evaluation. The part of the spring investigation carried out by local voluntary correspondents was less likely to have arrived in the local taxation department. Nevertheless the dynamic of that part of the spring survey carried out by the local statisticians was likely to bear a fairly close resemblance to the dynamic of all the spring investigation data and so the dynamic as given by these data can be accepted as a fair proxy for the dynamic given by all the spring survey data.

In the following table I have summarised the results of my analysis of the scale of corrections applied to the basic sown area data from different sources:

	1			2	3	4	5	6
	i	ii	iii					
1916	+9.3%		+10.4%	+10.9%				
1920	+16.2%	+15.2%						
1921	+17.4%	+16.0%						
1922	+19.0%	+16.9%						
1923		+13.3%	+12.1%	+13.6%				
1924			+11.8%	+13.5%		+24.3%		
1925				+12.0%	+22.1%	+23.2%	+24.3%	
1926					+18.2%	+20.6%	+21.0%	
1927						+19.0%	+18.5%	+22.2%
1928							?	+12.9%
1929							?	?

The effect of these corrections on the dynamic was as follows:

1920/16	+6%			+2%				
1921/22	+1%	+1%						
1922/21	+1%	+1%						
1923/22		-3%						
1924/23		0	0					
1925/24			-1%			-1%		
1926/25					-3.2%	-2%	-3%	
1927/26						-1%	-2%	
1928/27							?	-7.6%
1928/27							?	?

Sources:

1. P.I.Popov EO., 1924, no.23/24, p.LXX for corrected data
   i Trudy TsSU, Tom XVIII,M.1924, p.122 for uncorrected data
   ii Trudy TsSU, Tom VIII, vyp.5, M.1924, p.185-6 for uncorrected
   iii Osnovniye elementy ....,M.1930, p.23 for uncorrected
2. corrected data from Abrege... M.1925, pp.54-61.
   uncorrected data from Osnovniye elementy ....,M.1930, p.23.
3. All data from N.Dubenetsky, SO, 1927, no.1, p.22.
4. Corrected data from Ezhegodnik khlebnoi torgovly[illegible], no.1, chast 2, M.1928, p.83.
5. Uncorrected data from Osnovniye elementy[illegible]....,M.1930, p.23.
   Correction coefficients also in V.M.Obukhov, SO .1928, no.5,p.16
   corrected data from Statisticheskii Spravochnik SSSR za 1928, M.1929, pp.
   uncorrected data from Osnovniye elementy ....,M.1930, p.23.
6. All data from Selskoye khozyaistvo SSSR v 1928/29g., M.1931, pp. vi-vii.

This table indicates a general escalation in the level of corrections until 1928 and then what appears to be an attempt by the statisticians to remove a large slice of these corrections. The attempt appears to have succeeded in 1928, but when the Expert Soviet attempted to maintain a low evaluation in 1929, this resulted in a major political assault on the statisticians, the purging of the Expert Soviet, the closing down of TsSU and the arrest of Groman. The official 1929 sown area figure then indicated a very rapid rate of growth (See table SA1).

f) The corrected grain sown area data by region

In section b) above I presented the uncorrected grain sown area data for the period 1916, 1923-27 with a breakdown by region and by grain. These can be used in comparison with the many available series on corrected grain sown area in order to assess the level and importance of the correction coefficients that were applied to these data. For years after 1927 where no detailed data on corrections exist we can just review the available data on corrected series.

The changing regionalisations employed over this period present us with particular problems in assessing the changing levels of sown area and the changing levels of corrections applied to the basic data.

In the following tables I will attempt to present the data in regional groupings that are as comparable as it is possible to get them, but in several cases the degree of non-comparability will remain fairly high, and much of the apparent regional correction coefficient will be a consequence of regional non-comparability. Nevertheless these computed correction coefficients will still be of use as their changing levels over time will be a reflection of the changing levels of correction applied.

First, I will consider Popov's data for the sown area of all crops in 1916 and 1920-24. The actual regional breakdown of these figures and their levels in comparison with their 1916 levels are given in the following table: (see over page).

These figures indicate that by 1920 NCR had suffered the largest regional decline but that its sown area continued to grow over the following years, while the sown area in all other regions fell to a low point in 1922 before beginning their recovery. The CPR suffered a particularly serious decline in these years and still had a very low level in 1924. The low figure for the EPR recovery is somewhat misleading because the EPR level of sowings in 1916 had been much higher than before the war.

The sown area of all crops 1916-1924 in mln.hectares (TsSU data 1924 with corrections)

	1916	1920	1921	1922	1923	1924
1. NCR	13.24	9.14	10.29	11.71	12.33	13.42
3. SPR						
a)UkSSR	22.54	22.00	22.00	17.60	20.57	21.97
b)Yugo Vostok	9.18	6.65	6.67	5.03	6.57	6.78
3. all SPR	31.72	28.65	28.67	22.63	27.14	28.74
4. CPR	39.41	31.56	27.98	23.29	30.01	33.10
5. EPR						
a) Sibir	5.59	6.26	4.69	4.41	4.87	5.37
b) Kirgiz	4.59	4.35	3.17	2.10	2.09	2.78
5. all EPR	10.18	10.61	7.86	6.51	6.96	7.66
All USSR	94.53	79.96	74.81	64.13	76.43	82.93

	1916	1920	1921	1922	1923	1924
1. NCR	100	69.0	77.8	88.4	93.1	101.6
3. SPR						
a)UkSSR	100	97.6	97.6	78.1	91.3	97.5
b)Yugo Vostok	100	72.1	72.7	54.8	71.6	73.8
3. all SPR	100	90.4	88.2	71.4	85.6	90.6
4. CPR	100	80.1	71.6	59.1	76.1	84.0
5. EPR						
a) Sibir	100	112.0	84.0	78.8	87.1	96.1
b) Kirgiz	100	94.9	69.1	45.7	45.5	49.9
5. all EPR	100	104.3	77.3	63.9	68.4	75.3
All USSR	100	94.5	79.1	67.8	80.8	87.7

Source: P.I.Popov, 'Itogy' khoz.goda i sel.khoz.balans, in EO., 1924, no.23/24, p.LXX.

In order to estimate the size of corrections applied and to assess the relative contribution of the indications of the raw data and the effect of the changing level of correction coefficients on the raw data, I have carried out the same kind of calculation as in the previous section. The results are given in the following table: see over page.

These figures are indicative of a great variation in the level of corrections between different regions and different years. Any errors that I might have made in the comparability of the regionalisations would be reflected in the different magnitudes of correction between the different regions and so this element must be treated with caution. But changes in the magnitude of correction for the same region in different years could only be explained in terms of changes in the level of corrections applied.

Considering just the changes in magnitude of correction within the same regions we see that the levels of correction applied to the NCR actually fell between 1916 and 1920 and only rose slightly by 5% from 1920 to 1922. The level of correction applied to the CPR was also fairly stable after a rise of 8% between 1916 and 1920 it appears to have fallen towards 1922. The SPR appears to have had a steep rise by about 11% between 1916 and 1920 and then it rose slightly by 2% in 1921. The dynamic of corrections in the EPR appears to have been quite exceptional with very low levels of correction until 1921 and then with an extremely high rise in the level of correction by over 18% between 1921 and 1922.

It is possible to see some form of rationale behind these different regional movements. There certainly would have been most pressure on the peasants in the NCR and CPR in the early years and so we would have expected the level of corrections needed there to be the highest. The pressure in the EPR would only have come at the time of the 1921 harvest,

The implied correction coefficients from Popov's all crop sown area data, and the relative contribution of changes in correction coefficients and changes in raw data to the accepted change in level of sown area.

	1916	1920	1921	1922	1923	1924	1920/16	1921/20	1922/21	1923/22
Corrected data										
1. NCR	13.24	9.14	10.29	11.71	12.33	13.42	0.69	1.13	1.14	1.05
3. SPR	31.71	28.65	28.67	27.63	27.14	28.74	0.90	1.00	0.79	1.20
4. CPR	39.41	31.56	27.98	23.29	30.01	33.10	0.80	0.89	0.83	1.29
5. EPR	10.17	10.61	7.86	6.50	6.96	7.66	1.04	0.74	0.83	1.07
All USSR -SCR	94.53	79.96	74.81	64.13	76.43	82.93	0.85	0.94	0.86	1.19
Uncorrected data										
1. NCR (i)	11.14	7.83	8.59	9.62			0.70	1.10	1.12	
(ii)		7.89	8.74	9.85	10.16			1.11	1.13	1.03
3. SPR	30.93	25.05	24.63	19.52	24.51		0.81	0.98	0.79	1.26
4. CPR	34.13	25.56	22.96	19.44	26.95		0.75	0.90	0.85	1.39
5. EPR	10.27	10.37	7.53	5.30	5.83		1.01	0.73	0.70	1.10
All USSR -SCR (i)	86.47	68.81	63.71	53.88			0.80	0.93	0.85	1.23
(ii)		69.4	64.51	54.87	67.45			0.93	0.85	
Correction coefficients										
1. NCR (i)	1.19	1.17	1.20	1.22			0.98	1.03	1.02	
(ii)		1.16	1.18	1.19	1.21			1.02	1.01	1.02
3. SPR	1.03	1.14	1.16	1.16	1.11		1.12	1.02	1.00	0.96
4. CPR	1.16	1.24	1.22	1.20	1.11		1.07	0.99	0.98	0.93
5. EPR	0.99	1.02	1.04	1.23	1.19		1.03	1.02	1.17	0.97
All USSR -SCR (i)	1.09	1.16	1.17	1.19			1.06	1.01	1.01	
(ii)		1.15	1.16	1.17	1.13			1.01	1.01	0.97

Sources: calculated from the above table, the regionally adjusted data from Trudy TsSU, Tom XVIII, M.1924, pp.122-5 for uncorrected data 1916-20 apart from items marked (i) for uncorrected 1923 data and other uncorrected data marked (ii) from Trudy TsSU, Tom VIII, vyp.5, M.1924 pp. 185-6

probably after the 1921 sown area evaluations had been made and so might well only appear in the 1922 sown area figures. And we would also expect the pressure in the SPR to be greater in 1921 and 1922 than in the earlier years.

If we turn now to consider the relative contribution of the uncorrected data and the corrections to inter-temporal changes in the level of sown area, we see that the maximum overall effect of the application of these corrections was to increase the final size of the 1920 harvest in comparison with 1916 by 6%. The overall effect of the corrections is to lower the indication of growth from 1922 to 1923 by 3%. As regards the effect on the separate regions: the corrections had little effect on the final level of growth in the NCR, quite a large effect 12 and 7% respectively for the SPR and CPR 1920/16 comparisons and a very large effect (17%) on the final appearance of the decline in the EPR between 1921 and 1922.

The regional effect of the application of the correction coefficients are quite large and quite varied. It would therefore be quite incorrect to apply undifferentiated correction coefficients to all the data.

The series of corrected grain sown area data were published in 1925[1]. The regional data are given in the following tables: (see over) these figures are also given in column 7 of table SA1 and in source 4 in table SA2,

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1. See Abrege des donnees statistiques de l'URSS, M.1925, pp.60-61. Figures compatible with this series but in more detail for 1923 and 1924 were provided in the 1923/24 balance of the national economy Trudy TsSU tom 39, M.1926, and in other works of Trudy TsSU

	Sown area in mln.hectares				Sown area in % of 1916			
	1916	1923	1924	1925	1916	1923	1924	1925
NCR	10.29	10.03	10.62	10.87	100	97.5	103.2	105.6
SCR			3.13					
SPR	29.15 (25.10)	23.19	24.57	25.95	100 (100)	79.6 (92.3)	84.3 (97.9)	89.0 (103.4)
CPR	30.64	22.80	24.05	24.93	100	74.4	80.0	81.4
EPR	16.02	10.70	12.35	13.82	100	66.8	77.1	86.3
All -SCR	86.10 (79.51)	66.72	71.59	75.57	100 (100)	77.5 (83.9)	83.1 (90.0)	87.8 (95.0)
All			74.72					

Source: Abrege des donnees statistiques de l'URSS, M.1925, pp.54-61.

Note: There is some uncertainty as to whether the 1916 figures refer to sowings on all lands or just peasant lands. If they do refer to sowings on all lands the figures for peasant land alone would be equal to those given in the brackets for all -SCR and for SPR.

The level of regional recovery indicated in the Popov series for all crops up to 1924 appears to hold for all grains and in 1925 there was a rapid improvement in all areas apart from the ailing CPR which only registered a slight improvement.

The apparent level of corrections applied to these data by region and the effect of these levels of corrections on the annual dynamic are indicated in the following table:(see over page).

Here we see that the level of correction was falling in most areas but appears to have been increasing in the NCR. Whereas in all other regions the effect of the changing levels of corrections was to reduce the level of growth from 1923-25, in the NCR the effect of these changes was to help increase it. I can think of no justification for this phenomenon. The level of correction applied to the NCR and SPR appears to be about half the average level, but care must be taken here because of the problems of regional comparability. The level of corrections applied to the 1916 data is difficult to understand. If the 1916 figures

given in this source refer to all grain sown area, i.e. on pomeshchik as well as peasant land, then the level of corrections applied are very small. But if they apply to peasant lands only then they indicate the need for an extremely high level of correction in the SPR, and a subsequent reduction in the SPR level of correction in the early 1920s. This seems highly unlikely and since the SPR was the major region of non-peasant farming it seems far more likely that these data refer to all land.

We move now on to the post-Expert Soviet data. Here the regional task gets a little easier as the uncorrected Gayster data were worked out in the regions used by TsSU and the Expert Soviet in the late 1920s. Apart from this several of the sources provide fairly detailed accounts of the regional data.

The following table presents an indication of the regional correction coefficients used by the Expert Soviet in 1927 and 1928. These are the figures actually given by the Expert Soviet spokesmen (Dubenetsky in 1927 and Obukhov in 1928) and so there are no problems concerning lack of regional comparability: (see over).

We see that the level of corrections was lowest in the consumer regions of the RSFSR, the Ukraine and initially also in the Central Agricultural region. However, in the 1928 evaluations the level of correction applied to the latter region appears to have been exceptionally sharply increased. The highest level of corrections had initially been applied to the data from Siberia, but the correction coefficients accepted in 1928 gave a lower value here for 1925 and a low value also in the Urals for 1925 and 1926. The only other region to experience a real decline in coefficients was the NCR; all the other regions received increases in correction coefficients.

For an indication of the regional dynamic of grain sowings in the late 1920s, and the contribution of correction coefficients to this dynamic

The regional dynamic of sown area for all crops 1916, 1923-25 corrected and uncorrected data compared.

	1916		1923	1924	1925	1923/16		1924/23	1925/24
Corrected data									
NCR	10.29		10.03	10.62	10.87	0.97		1.06	1.02
SPR	29.15		23.19	24.57	25.95	0.80		1.06	1.06
CPR	30.64		22.80	24.05	24.93	0.74		1.06	1.04
EPR	16.02		10.70	12.35	13.82	0.67		1.15	1.12
All -SCR	86.10		66.72	71.59	75.57	0.77		1.07	1.06
Uncorrected data	(a)	(b)				(a)	(b)		
NCR	9.73	10.23	9.58	9.89	10.09	0.98	0.94	1.03	1.02
SPR	23.89	27.74	20.83	22.41	23.68	0.87	0.75	1.08	1.06
CPR	28.09	30.12	19.29	20.44	21.83	0.69	0.64	1.06	1.07
EPR	15.95	15.98	9.05	10.40	11.87	0.57	0.57	1.15	1.14
All -SCR	77.65	84.08	58.74	63.08	67.47	0.76	0.70	1.07	1.07
Correction coefficients									
NCR	1.06	1.01	1.05	1.07	1.08	0.99	1.04	1.02	1.01
SPR	1.22	1.05	1.09	1.07	1.05	0.89	1.04	0.98	0.98
CPR	1.09	1.02	1.18	1.18	1.14	1.08	1.16	1.00	0.97
EPR	1.00	1.00	1.18	1.19	1.16	1.18	1.18	1.01	0.97
All -SCR	1.11	1.02	1.14	1.13	1.12	1.03	1.12	0.99	0.99

Sources: calculated from the above table and the regionally adjusted uncorrected data from Osnovniye elementy.....,M.1930, pp. 14-41.

Note: In order to adjust the Osnovniye elementy data for the inclusion of Tula G., and Ryazan G., in the Tsent. Prom. Region of NCR instead of Tsent Chernozem of CPR 25% was added to Ts.ChZem and deducted from NCR.
column (a) refers to peasant only sowings, column (b) to the sowings of all groups.

Correction coefficients accepted by the Expert Council in 1927 and 1928

Region	1925 (i)	1925 (ii)	1926 (i)	1926 (ii)	1927
1. NCR (RSFSR part)	18.0%	18.4%	16.6%	16.0%	15.4%
BSSR	30.2%	24.9%	27.3%	24.0%	14.6%
2. SCR					
3. SPR					
UkSSR	16.0%	14.2%	13.5%	14.3%	14.5%
Crimea ASSR	20.0%	22.6%	14.7%	17.3%	7.3%
N.Caucasus & Dag.	30.2%	32.7%	23.4%	26.3%	21.5%
4. CPR					
C.Ch.Zem.	18.2%	23.0%	14.5%	23.2%	21.7%
N.Volzh.Kr.	27.5%	30.8%	23.7%	31.0%	25.8%
Sred Volzh.		33.6%		27.6%	27.8%
Volzh.Kamskii	19.9%	23.4%	16.5%	20.1%	15.6%
5. EPR					
Urals	28.7%	25.2%	29.1%	22.2%	22.3%
Sibir Krai	34.0%	32.9%	17.5%	22.0%	22.2%
Far East & BM		30.0%		19.3%	19.7%
All USSR -SCR		23.2%		20.5%	19.0%
All USSR given	22.1%		18.2%		

Source: (i) N.I.Dubenetsky, SO. 1927, no.1, pp.22-3.

(ii) V.M.Obukhov, SO.,1928, no.5, p.16.

in the late 1920s, and the contribution of correction coefficients to this dynamic, I have computed another regional table of data comparing the 1929 TsSU corrected series with Gayster's uncorrected series: see table over page.

The corrected data indicate a significant slow down in the growth of grain sown area in all regions in 1927 apart from the SCR. This was followed in 1928 by sowings in the SPR, NCR and EPR. Most of the effect of the slow down in the 1927 growth of the sown area in most of the regions was a consequence of changes in the correction coefficients applied in 1927. The greatest deflating effect of the change in levels of corrections was in the CPR where they alone would have resulted in a deflation by 4.4%. With the exception of the untypical SCR, the deflating effect of the change in correction levels was the least in the SPR. This was a region which anyway had a relatively low level of correction applied to it, and it was also the region which was to suffer most in the following year as a consequence of the winter killings.

No indications of the level of regional corrections or of the uncorrected data are available after 1927. The available data which all include a correction coefficient indicate a renewed growth in most regions although the level of growth in the SPR does not offset the full scale of the 1928 decline in that region: see also summary table SA2 source 6

The regional dynamic for grain sown area corrected and uncorrected data compared 1925-1928, *in million hectares:*

	1925	1926	1927	1928	% change in sown area 1926/25	1927/26	1928/27
Corrected data							
NCR	14.07	14.42	14.59	13.84	+2.5%	+1.2%	-5.1%
SCR	3.63	3.73	3.84	3.94	+2.8%	+2.9%	+2.6%
SPR	27.06	29.30	29.65	27.26	+8.3%	+1.2%	-8.1%
CPR	26.14	27.67	28.08	28.85	+5.8%	+1.5%	+2.7%
EPR	16.25	18.32	19.04	18.56	+12.7%	+3.9%	-2.5%
USSR	87.16	93.48	95.20	92.45	+7.3%	+1.8%	-2.9%
Uncorrected data							
NCR	11.60	12.11	12.56	?	+4.4%	+3.7%	?
SCR	2.65	2.81	2.81	?	+6.0%	0	?
SPR	23.68	26.06	26.64	?	+10.1%	+2.2%	?
CPR	20.33	27.09	23.23	?	+8.7%	+5.2%	?
EPR	11.87	14.14	15.07	?	+19.1%	+6.6%	?
USSR	70.12	77.21	80.31	?	+10.1%	+4.0%	?
Correction coefficient					Growth caused by change in correction coefficient		
NCR	+21.3%	+19.1%	+16.2%	?	-2.2%	-2.9%	?
SCR	+37.0%	+32.7%	+36.7%	?	-3.2%	+3.0%	?
SPR	+14.3%	+12.4%	+11.3%	?	-1.9%	-1.1%	?
CPR	+28.6%	+25.3%	+20.9%	?	-3.3%	-4.4%	?
EPR	+36.9%	+29.6%	+26.3%	?	-7.3%	-3.3%	?
USSR	+24.3%	+21.1%	+18.5%	?	-3.2%	-2.6%	?

Sources: Corrected data Statisticheskii spravochnik SSSR za 1928, M.1929, p.160

Uncorrected data Osnovniye elementy ...., M.1930, pp.14-41.

The changes in grain sown area by region in mln.hectares in corrected data;

	1927	1928	1929	1928/27	1929/28
NCR	14.29	13.42	13.86	0.94	1.03
SCR	3.86	4.04	4.31	1.05	1.07
SPR	30.48	27.64	29.20	0.91	1.06
CPR	27.64	28.27	28.81	1.02	1.02
EPR	18.46	18.81	19.82	1.02	1.05
USSR	94.73	92.17	96.01	0.97	1.04

Source: Narodnoye khozyaistvo SSSR, M.1932, pp.154-61

Note: Figures refer to grain from all sectors of production and not just from peasants.

As explained above these figures for 1929 are probably a little higher than they should be to be comparable with the other data, but if they were to be deflated it is uncertain what form of regional deflator should be applied.

Although we have a partial coverage of all the years in the 1920s we have no lengthy series of data differentiated by region. The most complete series is the one given by Gayster which contains no correction coefficients. None of the partial series of the late 1920s went further back than 1924. A source from the late 1930s provides regional comparison between the corrected 1928 data and data for the year 1913.

	1913	1928	1928/1913
NCR	13.09	13.50	+3.1%
SCR	4.56	4.08	-10.5%
SPR	31.74	27.65	-12.9%
CPR	29.98	28.31	-5.6%
EPR	14.99	18.64	+24.3%
USSR	94.36	92.17	-2.3%

Source: Posevniye ploshchadi SSSR, M.1939, pp.15-23.

But on examination it is clear that the 1913 figures are given without any correction being applied to them at all. This series and other available series of data enable us to ensure regional comparability over this

period, but not comparability as regards the application of correction. In the concluding section to this chapter I will offer my own series of regional data which have been constructed with an attempt to ensure both regional comparability and comparability as regards the application of correction coefficients with these series of data for the late 1920s. But next we will briefly discuss the data on non-peasant grain sown area.

g) Non-peasant sown area data

The above sections have referred primarily to the sown area in peasant lands. The area sown by sovkhozy and kolkhozy was in any case relatively insignificant until the late 1920s. During the period 1921-26 the scale of sovkhoz and kolkhoz sown area was calculated from data supplied by the taxation authorities and the land organs. But from 1927 until 1929 TsSU carried out a full census of these organisations[1].

Apart from the peasant, sovkhoz and kolkhoz grain sowings, the data included in the grain utilisation balances, also included an estimate of other grain sown in urban areas. These estimates were based on so-called expert evaluations made by the GSB on the basis of data supplied by gorsoviety, by taxation depts, and from other sources. For 1925 and 1926 the level of town grain sowing was estimated to have been 0.49 mln.hectares and the level of sovkhoz and kolkhoz grain sowings taken together was about 1.53 mln.hectares[2]. At this time therefore non-peasant grain sowing accounted for just over 2% of all grain sowings.

Later in 1927, the official Expert Soviet preliminary account of the 1927/28 grain forage balance supplied slightly larger and more detailed information on grain sowings by sector for 1925, 1926 and 1927:

	Peasant households	Sovkhoz & Kolkhoz	All Rural	Urban	All
1925	86.40	1.64	88.04	(0.62)	88.66
1926	93.18	1.65	94.83	(0.55)	95.38
1927	95.64	1.65	97.29	(0.57)	97.86

1. The investigations of the kolkhozy were subsequently reported in great detail in special statistical handbooks, Selskokhozyaistvenniye kollektivy SSSR na 1 Maya 1928g., M.1928; Kollektivizatsiya sovetskoi derevni, M.1929; Kolkhozy v 1928g., M.1932; K itogy obsledovaniya kolkhozov, M.1932; and Kolkhozy v 1929g. - Itogy splosnogo obsledovaniya kolkhozov, M.1931. The results of the investigation of sovkhozy were included in the general agricultural statistical handbooks without there being any special TsSU publication on them.

2. See N.Dubenetsky, SO., 1927 no.1, pp.21 and 23.

Sown area by producer in million hectares:

	NCR	SCR	SPR	CPR	EPR	USSR
1925						
Peasant	13.88	3.04	28.17	25.91	15.38	86.40
SF & CF	0.11	-	0.91	0.49	0.16	1.64
all rural	14.00	3.04	29.08	26.40	15.53	88.04
urban	(0.10)	-	(0.35)	(0.01)	(0.11)	(0.62)
All	14.10	3.04	29.43	26.41	15.64	88.66
1926						
Peasant	14.27	3.28	30.64	27.70	17.29	93.18
SF & CF	0.12	-	0.91	0.47	0.16	1.65
all rural	14.38	3.29	31.55	28.16	17.45	94.83
urban	(0.10)	-	(0.33)	(0.01)	(0.11)	(0.55)
All	14.48	3.29	31.88	28.17	17.56	95.38
1927						
Peasant	14.59	3.29	31.08	28.44	18.24	95.64
SF & CF	0.11	0.01	0.91	0.46	0.16	1.65
all rural	14.70	3.30	32.00	28.90	18.39	97.29
urban	(0.10)	-	(0.33)	(0.01)	(0.11)	(0.57)
All	14.80	3.30	32.33	28.91	18.50	97.86

Source: See Predpolozhitelny Khlebofurazhny balans na 1927/28 sel'khoz god., M.1927, pp 28-31

Note: The urban sown area figures have been estimated on the basis of the urban grain production figures and the regional rural yield figures.

The non-peasant grain sown area now appeared to cover 2.5% of all the grain sown area, with the highest proportion in the producer regions (4.3% in SPR, 1.9% CPR, and 1.7% EPR) and much lower proportions in the consumer regions (1.5% NCR and 0% SCR).

By comparing the data given by Dubenetsky in 1928 with that published in the official grain trade handbook, it is possible to extend the series of peasant and non-peasant sowings back to 1924. They provide the following dynamic:

Sown area in million hectares

	Peasant	non-peasant	All including urban
1924	81.82	2.1	93.9
1925	86.37	2.1	88.5
1926	93.14	2.2	95.3
1927	95.60	2.1	97.7

Sources: N.I.Dubenetsky, SO . 1928, no.2, p.19.
Ezhegodnik po khlebnoi torgovlye, no.1, M.1927, p.183

These figures clearly indicate the small size of non-peasant sowings, and the picture of the proportion of non-peasant sowings to grain at this time.

After 1927 we see the first signs of the coming change in sectoral organisation of grain production, as the proportion of both Sovkhoz and Kolkhoz sowings begins to rise.

	Peasant	Sovkhoz	Kolkhoz	All rural sowings
1927	93.12	1.03	0.58	94.73
1928	90.04	1.10	1.04	92.17
1929	91.08	1.54	3.39	96.01

Source: Sdvigi v.sel.khoz...,M.1931, pp.142-145

It should be noted that these and all subsequent figures exclude urban sowings, and that the Sovkhoz sector includes the sowings of certain state organisations as well as just Sovkhozy[1].

The regional growth in Sovkhoz and Kolkhoz sown area, in comparison with the earlier figures given in the following table: (see over page)

By 1929 the non-peasant rural grain sown area had risen to 5.1% of all the grain sown area. The producer areas especially SPR still predominated; SPR 7.2%, EPR 6.8%, CPR 4.2% and the consumer regions were much lower but were also growing: NCR 1.7%, SCR 2.3%. Most of the growth in coverage of non-peasant sowings was a consequence of the increase in collectivised

1. See Sdvigi v Sel.Khoz...,M.1931, p.210.

Sown area in mln.hectares.

SF & CF together	NCR	SCR	SPR	CPR	EPR	USSR
1925	0.11	-	0.91	0.49	0.16	1.64
1926	0.12	-	0.91	0.47	0.16	1.65
1927	0.11	-	0.91	0.46	0.16	1.65
1928	0.14	0.02	0.99	0.52	0.46	2.13
1929	0.23	0.10	2.16	1.21	1.35	4.93
	(1.7%)	2.3%	7.2%	4.2%	6.8%	5.1%
CF alone						
1928	0.05	0.02	0.46	0.20	0.30	1.04
1929	0.13	0.08	1.38	0.72	1.10	3.39
SF alone						
1928	0.09	0.01	0.53	0.32	0.16	1.10
1929	0.10	0.02	0.71	0.46	0.25	1.54

Sources: see Sdvigi v Sel. khoz... M1931, pp142-3

households. Between the 1928 and 1929 harvests the area of grain under collectivised households grew by more than 300%.

There were significant differences in the kinds of grain by the different sectors, and these changed quite significantly over this period:

	SF			CF			All		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
Winter Rye	17.3	13.7	12.3	16.8	9.3	8.6	28.2	26.2	25.4
Winter Wheat	20.8	15.9	13.6	22.5	8.6	9.4	11.3	6.7	6.8
Spring Wheat	14.6	16.5	27.3	23.1	35.1	38.3	21.7	23.4	24.1
Oats	30.7	32.5	26.6	17.3	18.4	19.5	18.9	18.7	19.6
Spring Barley	4.9	6.3	8.4	7.3	10.1	10.3	6.8	7.5	8.0
Others	11.7	15.1	12.3	13.0	18.5	13.9	13.1	17.5	16.0
All	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: see Sdvigi v Sel. khoz..., M1931, pp142-3

Both the SF and CF sowed a much smaller proportion of Winter Rye than the individual peasant sector, and the proportion of Winter Rye fell sharply towards 1929. In the Sovkhozy the share of oats sown throughout this period was high and the share of spring wheat sown only grew to large proportions in 1929. For the Kolkhozy the share of winter and spring wheat were both very high in 1927, subsequently the share of winter wheat fell greatly, but was more than compensated by the growth in the area of spring wheat sown.

h) General summary and evaluation of the reliability of grain sown area data.

The level of corrections applied to the basic grain sown area data in this period changed significantly according to when the evaluation was made. In the early period relatively no corrections were applied, in 1924 and 1925 a moderately high level of corrections was applied and in the late 1920s an extremely high level was applied. But all these corrections indicated the same kind of year to year change. They all registered a decrease in scale after 1922. This is certainly the kind of movement that we would expect. Differences of opinion therefore centre around the general level of these falling corrections. The differences in the levels of corrections applied to the different Expert Soviet series are only a few percent and may therefore be ignored. The main differences lie between the 1924 and 1925 TsSU series and the late 1920s Expert Soviet series. The values of the computed corrections from these series are listed below together with my estimates of the corrections required to make each series complete for all years up to 1927.

	Early TsSU 1924 & 1925	Expert Soviet 1927-29	Estimated complete series (i)	(ii)
1916	+10.9		+10.9	+17.0
1920	+15.2		+15.2	+25.0
1921	+16.0		+16.0	+27.0
1922	+16.9		+16.9	+28.0
1923	+13.6		+13.6	+25.0
1924	+13.5	+24.3	+13.5	+24.3
1925	+12.0	+23.2	+12.0	+23.2
1926		+20.6	+11.0	+20.6
1927		+19.0	+10.0	+19.0
1928		+12.9?	+7.0	+12.9
1929				

Sources: See table above on p.372

Notes: The estimated values have been made to ensure a comparable overall pattern with declining rates of correction after 1922 and with the 1916 correction coefficient 71.7% of the 1920 level. The 1928 correction coefficient is indicated by the tax data. Obukhov justified such a sharp decline on the grounds that 'kontraktatsiya' was inducing the peasants to over-state rather than conceal their real level of sowings.

If we apply these correction coefficients to the uncorrected basic data for all available years we receive the following two variants of sown area figures (in million hectares):

	uncorrected data			data corrected by estimated series	
	a	b	c	(i)	(ii)
1909/13		83.74	91.5		
1916	87.05	79.71	87.1	96.5	101.8
1920		63.59	69.4	79.8	86.8
1921		58.33	63.7	73.9	80.9
1922		47.66	52.0	60.8	66.6
1923	61.57			69.9	77.0
1924	65.83			74.7	81.8
1925	70.12			78.5	86.4
1926	77.21			85.7	93.1
1927	80.31			88.3	95.6
1928	81.64			87.4	92.2

Sources: uncorrected data a) 1916,1923-27, A.Gayster (ed.) ibid., 1928 calculated from tax data
b) Trudy TsSU Tom.XVIII, M.1924, pp.122-5
c) Calculated by applying 1916 ratio of a/b to all b) data.

The 1929 figure as given in contemporary sources was 96.0 mln.hectares I have very grave doubts about the reliability of this figure. It does appear to be more of an optimistic presumption of the targeted plan fulfilment and I doubt whether the real level was very much above 94 mln.hectare in a series comparable with ii) or 88 mln.hectares in a series comparable with i). But evidence for this is admittedly slight[1].

The problems involved in computing series of regionally comparable sown area figures are far greater, because of the changing regional areas. But such an attempt has been made.

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1. It is mainly circumstantial based on the observed conflict in the Expert Soviet in the Autumn of 1929, and in Osinsky's later denunciation of sown area statistics on these grounds.

The differences in the regional correction coefficients applied to sown area data from the early and late 1920s sources are indicated in the table below:

(in mln hectare)

	Corrections applied to 1923 sown area data	
	Early 1920s ✓	Late 1920s
NCR	21.0	19.5
SCR		
SPR	11.0	19.3
CPR	11.0	31.8
EPR	19.0	36.3
All	13.0	25.0

Sources: early 1920s data see above p. 377
Note: these figures apply strictly to all sown area and not just to grain sown area, late 1920s
Late 1920s data are compared with source 5 data in Table SA 2 See appendix

Hardly any change had been made to the scale of corrections applied to data in the NCR, although very large additional corrections had been applied to the data in all the producer regions and especially the CPR.

The uncorrected basic regional sown area figures are given in the following tables together with series comparable with the correction coefficients applied in the late 1920s and with those applied in the early 1920s:

Uncorrected basic sown area data, in mln hectare:

	NCR	SCR	SPR	CPR	EPR	USSR
1909/13	14.1	2.93	31.1	30.6	13.9	92.6
1913	14.3	3.29	31.9	30.9	16.0	96.4
1916	12.1	3.0	27.7	28.3	16.0	87.1
1917	12.3	(3.0)	27.5	28.8	15.8	87.4
1920	8.9	(2.8)	21.9	21.1	14.2	68.9
1921	9.8	(2.8)	21.5	18.9	11.3	64.3
1922	10.8	(2.8)	16.4	17.2	7.6	54.8
1923	11.0	2.8	20.8	17.9	9.1	61.6
1924	11.3	2.8	22.4	19.0	10.4	65.9
1925	11.6	2.7	23.7	20.3	11.9	70.1
1926	12.1	2.8	26.1	22.1	14.1	77.2
1927	12.6	2.8	26.6	23.2	15.1	80.3
1928						
1929						

Sources: For uncorrected sown area regional table 1916, 1923-27, A.Gayster (ed.) ibid.
1909/13, 1916, 1917, 1920-22, Trudy TsSU, Tom XVIII, M.1924 pp.22-5. 1913 from regrouped TsSK data, see appendix p. 44

Correction coefficients comparable with early 1920s data on grain sown area:

	NCR	SCR	SPR	CPR	EPR	USSR
1909/13	0		0	0	0	0
1913	0		0	0	0	0
1916	19	(10)	3	16	0	10
1920	16	(15)	14	24	2	15
1921	18	(16)	16	22	4	16
1922	19	(17)	16	20	23	17
1923	21.0	(13)	11.0	11.0	19.0	13.0
1924	(19)	(12)	(10)	(10)	(17)	(12·7)
1925	(18)	(11)	(9)	(9)	(15)	(11·8)
1926	(17)	(10)	(8)	(8)	(14)	(10.8)
1927	(14)	(10)	(7)	(7)	(12)	(9.2)
1928						
1929						

Sown area figures comparable with early 1920s data, in mln hectares:

1909/13	14.1	2.9	31.1	30.6	13.9	92.6
1913	14.3	3.3	31.9	30.9	16.0	96.4
1916	14.4	3.3	28.5	32.8	16.0	95.0
1920	10.3	3.2	25.0	26.2	14.5	79.2
1921	11.6	3.2	19.4	23.1	11.8	69.1
1922	12.9	3.2	19.0	20.6	9.3	65.0
1923	13.3	3.2	23.1	19.9	10.8	70.3
1924	13.4	3.2	24.6	20.9	12.2	74.3
1925	13.7	3.1	25.8	22.1	13.7	78.4
1926	14.2	3.1	28.2	23.9	16.1	85.5
1927	14.4	3.1	28.5	24.8	16.9	87.7
1928						
1929						

Correction coefficients comparable with the late 1920s data on grain sown area:

	NCR	SCR	SPR	CPR	EPR	USSR
1909/13	+10.0		+10.0	+10.0		+10.0
1913	+10.0		+10.0	+10.0	+10.0	+10.0
1916	+8.0	+8.0	+12.7	+11.8	+14.2	+11.5
1920	+19.0		+18.0	+30.8	+34.7	+24.5
1921	+19.5		+19.0	+31.8	+36.3	+24.9
1922	+20.5		+20.0	+32.8	+37.0	+26.6
1923	+19.5	+42.0	+19.3	+31.8	+36.3	+26.3
1924	+18.9	+40.0	+17.5	+30.9	+35.3	+25.5
1925	+18.8	+37.7	+17.5	+26.6	+32.7	+23.7
1926	+16.6	+37.5	+15.6	+23.3	+25.6	+20.6
1927	+13.8	+37.4	+14.4	+19.0	+22.5	+17.9
1928	?					
1929	?					

Sown area figures comparable with the late 1920s data, in mln hectare:

1909/13	15.5	3.2	34.2	33.7	15.3	101.9
1913	15.7	3.2	35.1	34.0	17.6	105.6
1916	13.1	3.2	31.3	31.6	17.9	97.1
1920	10.6	(3.2)	25.8	27.6	18.6	85.8
1921	11.7	(3.6)	25.6	24.1	14.9	80.[illegible]
1922	13.0	(3.8)	19.7	22.8	10.1	6[illegible]
1923	13.2	4.0	24.8	23.5	12.3	77.[illegible]
1924	13.5	3.9	26.5	24.8	14.1	82.7
1925	13.8	3.7	27.8	25.7	15.8	86.7
1926	14.1	3.9	30.1	27.2	17.8	93.1
1927	14.3	3.9	30.5	27.6	18.5	94.7
1928	13.4	4.0	27.6	28.3	18.8	92.2
1929	13.9	4.3	29.2	28.8	19.8	96.0

In 1939 TsUNKhU published a series of detailed sown area statistics covering the period 1913, 1928, 1932-38[1]. These are the figures that are currently accepted in TsSU[2]. These figures presented the 1913 sown area data without any corrections and compared them with the Expert Soviet 1928 figure including a fairly hefty correction. Instead of receiving an indication that the late 1920s grain sown area was 11-13% below the 1913 grain sown area as indicated by both the early and late 1920s evaluations this TsUNKhU series gave the impression that there had only been a 2% decline in grain sown area. The regional disparity between these series is even more disturbing as indicated in the following tables:

	Early 1920s			Late 1920s			1930s
	1927	1913	%	1927	1913	%	
NCR	14.4	14.3	+0.7	14.3	15.7	-8.9	
SCR	3.1	3.3	-6.1	3.9	3.2	+21.9	
SPR	28.5	31.9	-10.7	30.5	35.1	-13.1	
CPR	24.8	30.9	-19.7	27.6	34.0	-18.8	
EPR	16.9	16.0	+5.6	18.5	17.6	+5.1	
USSR	87.7	96.4	-9.0	94.7	105.6	-10.3	

	Late 1920s			Late 1930s		
	1928	1913	%	1928	1913	%
NCR	13.4	15.7	-14.7	13.5	13.1	+3.1
SCR	4.0	3.2	+25.0	4.1	4.6	-10.9
SPR	27.6	35.1	-11.4	27.7	31.7	-12.7
CPR	28.3	34.0	-16.8	28.3	30.0	-5.7
EPR	18.8	17.6	+6.8	18.6	15.0	+24.0
USSR	92.2	105.6	-12.7	92.2	94.4	-2.3

The major regional differences are·

1) a growth in late 1920s sown area in the NCR instead of a decline in comparison with the pre-war 1913 level.

2) a much smaller decline in the sown area in the CPR.

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1. See Posevniye Ploshchadyi SSSR, M.1939.
2. See Narodnoye khozyaistvo RSFSR v 1958g., M.1959, pp.231-2, and Narodnoye khozyaistvo SSSR v 1958g. M.1959 p.399.

3) and a much more rapid increase in the EPR.

The SPR figures are fairly comparable and the SCR figures are so unreliable that their values indicate little.

There appears to be no real statistical basis for accepting this TsUNKhU comparison, which gives every impression of being just a crude uncritical mechanical comparison of the available data.

There is, however, considerable uncertainty as to which of the two 1920s series should be accepted. Taking the overall levels of grain sown area for the USSR the early 1920s series would appear to be the most justified as I have argued that there was little justification for the large scale of corrections that were applied. But if we consider the regional breakdown of these data, it is quite possible that the later 1920s series gives the better regional picture. The method in which correction coefficients were applied in the later 1920s was certainly more sophisticated it was based on firmer data and although the final figures are all probably a little high this series probably provides the best indication for any detailed study.

After 1928 the position is even more uncertain.

3. Grain yields data, 1918-29

In this chapter I will again be introducing and discussing many series of statistics. In order to assist the reader to find his way through these materials, the main series have again been summarised in two summary tables. Table Y1 presents the average yield figures for the area of the whole country and table Y2 presents the average yield figures for my five major regions. The sources from which these figures were taken, the method of regrouping them and the data upon which the regroupings were based, are again included in the appendix.

For a very brief account of some of the problems involved in making comparisons between these data the reader is referred to the introduction in chapter two. It should however be noted that the effect of differences in coverage of the yield series are normally less significant than differences in the coverage of sown area data or production data. The effect of the differences in the coverage of the yield data only becomes significant if the yield in the excluded regions, sectors or grains differs substantially from that in the rest of the country.

The first section a) provides an account of how subjective evaluations of the preliminary harvest prospects were used by TsSU to ascertain the level of crop yield. This method had to be used as the results from the standard post-harvest investigations produced results that were unbelievably low. But corrections were still applied to them. In this section I describe the application of the sophisticated half point correction.

Section b) reviews and analyses the yield data received from these subjective harvest evaluations and the further corrections which appear to have been rather arbitrarily assigned to them.

Section c) presents an account of the different sources of data on

Table Y1 The major available series of data on grain *yield* in the USSR in *tsentners per hectare*

	Early TsSU			mid TsSU	Gos-plan	Expert Soviet			TsUNKhU		
	1	2a	2b	3	4	5	6	7	8	9	10a	10b
1905/14								7.5				
1909/13			7.5*	7.4							7.6	
1913						9.3					8.6	
1914											7.0	
1915											8.0	
16			7.2*								7.2	
17	6.8*		6.9*	7.0	7.0*						6.9	
18	6.0*										6.9	5.9
19	6.3*			5.6							7.2	6.2
1920	5.0*	4.6*	5.4*	5.4		5.6					5.7	5.4
21		4.0*	4.7*	4.7		4.4					5.0	4.8
22		6.4*	7.6*			8.3					8.1	7.6
23		5.2*	6.4*		7.1*	6.8					7.1	7.1
24					6.1*			6.3			6.2	
1925					8.4*		8.1	8.4	8.3	8.6	8.3	
26							8.2	8.2	8.2	8.4	8.2	
27								7.8	7.5	7.6	7.6	
28									7.7	7.9	7.9	
29										7.5	7.4	

All grain yields by region in tsentners per hectare from various sources

Source	Year	NCR	SCR	SPR	CPR	EPR	USSR	USSR -SCR
2	1913	7.7		9.7	8.2	7.3		8.6
	1916	8.4		8.4	8.0	6.2		7.8
	1920	5.8		2.3*	3.8	3.7		3.9
	1921	8.1		3.9*	4.1	4.8		4.6
3a	1909/ 13	7.2		8.4	7.3	6.3		7.5
	1916	7.7		8.2	6.8	5.8		7.2
	1917	6.6		8.3	4.8	7.3		6.9
	1920	6.3		7.0	3.6	4.5		5.4
	1921	6.9		5.5	3.4	3.9		4.7
	1922	6.9		9.2	6.4	7.0		7.6
3c	1923							
3b no corr-ectn.	1920	5.4		6.2	3.1	3.9		4.6
	1921	6.0		4.7	2.5	3.9		4.0
	1922	5.9		7.8	5.4	5.8		6.4
	1923	(5.1)		(7.2)	(3.9)	(4.1)		(5.2)
with corr-ectn.	1920	6.1		7.4	3.7	4.6		5.4
	1921	6.8		5.6	3.0	4.6		4.7
	1922	6.7		9.3	6.1	6.9		7.6
	1923	(5.7)		(8.7)	(5.0)	(5.2)		(6.4)
4	1916	6.8		8.2	6.2	7.2		7.0
	1923	6.5		8.8	6.0	6.3		7.1
	1924	7.0	9.6	6.3	4.4	7.3	6.1	6.1
	1925	7.3		10.7	6.7	7.9		8.4
5	1924	7.7	9.1	6.0	4.8	7.2	6.3	
	1925	8.1	9.4	9.8	6.9	8.4	8.4	
	1926	8.1	9.6	7.9	8.0	8.8	8.2	
	1927	8.2	8.7	8.6	7.6	7.5	7.8	
6	1925	8.1	9.3	9.6	6.9	8.5	8.3	
	1926	8.0	9.0	8.0	7.9	9.0	8.2	
	1927	7.8	7.9	8.1	7.0	7.2	7.5	
	1928	7.8	9.4	6.6	7.5	9.4	7.7	
7 & 8a	1928	8.4	9.4	7.0	7.7	9.2	8.0	
	1929	8.6	8.6	8.4	6.7	6.0	7.5	

Sources to data in table Y1

1. Trudy TsSU, Tom VIII, vyp.1, M.1921, pp.744-55.
   Note: data refers to 5 main grains only and to the area of the RSFSR and UkSSR only.

2. Trudy TsSU, Tom VIII, vyp.4, M.1923, p.393
   1923 values from Trudy TsSU, Tom VIII, vyp.5, M.1924, p.138

3. Yu.A.Polyakov, Istoricheskiye Zapiski, Tom.74, M.1963, p.113

4. Abrégé des données statistiques de l'URSS, M.1925,pp.62-5.

5. S.G.Strumilin, Plan.khoz. 1924, No.4-5

6. N.I.Dubenetsky, SO, 1927, no.1, p.28.

7. N.I.Dubenetsky SO, 1928, no.2, p.22.
   also Ezhegodnik khlebnoi torgovly- No.1, M.1928, p.84
   Note: the figure for 1905/14 average yields refers to the 7 main grains only.

8. Statisticheskii spravochnik SSSR, 1928, M.1929, pp.180-96

9. Sdvigi v Sel.Khoz. M.1932, p.154 and Narodnoye khozyaistvo SSSR M.1932, p.164

10. V.V.Osinsky, Itogyi urozhaya 1933g., M.1934, p.29
    a) was listed as corrected and b) as uncorrected.

* denotes area of USSR less SCR.

Sources to data in table Y2 are given in the appendix and the enumeration of the different sources is the same as in the appendix.

final post-harvest evaluations of grain yield. As explained above standard harvest data collected after the harvest had suffered a much greater level of concealment than had the preliminary harvest data, this was because the peasants were particularly suspicious of official enquiries once the harvest was collected. These enquiries had earlier been most obviously related to requisitioning activities and the peasants remained very suspicious of them. But as stability returned and the fear of requisitioning receded during the NEP the reliability of the data on post-harvest yield evaluations began to improve and TsSU began carrying out more complex methods of collecting information of the harvest results. The different methods used and the results from these different sources are presented in section c).

Section d) presents an account of the final calculated data on grain yield that were based on these different sources of data.

Section e) presents very briefly the available data on non-peasant grain production and yields. And the final section f) presents a general summary and evaluation of the reliability of grain yield data in this period.

a) The early years of TsSU; Subjective evaluations of grain yields 1918-25

For the first years of this period the yield data were based on the preliminary pre-harvest subjective evaluations of the harvest made by voluntary correspondents, local statisticians and other agents. These subjective evaluations were converted into physical qualities using at first a variety of local methods, which later became centralised and more uniform. After a period when no corrections were applied, there was another period when a variety of local corrections were applied before changing to a more centralised and uniform application of corrections.

Preliminary evaluations were made on the first and fifteenth of each month after the vegetation period had begun and were continued until the time that harvesting began. The final preliminary evaluation was made of the harvest prospects at the time of the first threshings. In the post revolutionary period the statisticians and correspondents were asked to make their subjective assessments on the basis of a five point scale; point 5 = fine, point 4 = higher than average, point 3 average, point 2 below average and point 1 poor.

Before the Revolution preliminary data on the condition of the harvest had been collected in various ways using anything from 3 point to 8 point systems in at least 27 provinces.During the war and revolutionary years the practice of making these calculations spread to other provincial statistical departments[1]. And the statisticians soon began to unify their procedures and adopt a 5 point scale.

At first all the data from all sources went into the local statistical offices and the local offices used their own methodology to convert

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1. See B.S.Yastremsky , Kolichestvennoye vyirazhenie subyektivnoi kharakteristiki urozhaya, first published in VS, 1922, no.5-8 and reproduced in B.S.Yastremskii Izbranniye trudy , M.1964, pp.290-326. The dates of the use of 5 point subjective evaluations of harvest prospects in these different gubernii are listed on pp.291-2 of that book.

subjective evaluations into quantitative terms. In those areas where razverstka (grain requisitioning according to plan) was developed local expert commissions at the uezd level (UEK) These were formed, composed of all local government agents and plenipotentiaries concerned with grain procurements. These included the chairmen of the local executive committee and the local statistical and agronomic agents as well as the taxation and procurement officials. These other agencies also supplied data. These local expert councils were the first to see the collected statistical data and they took an active role in applying their 'expertise', as well as their political muscle to assist in the process of converting subjective evaluations into quantitative terms.

This procedure was certainly very common in many areas during the evaluation of the 1920 harvest and it appeares to have been accepted by TsSU at that time[1]. But the central leadership of TsSU was not happy at losing control over assessing the local evaluations of its own agents. In the changed political circumstances after the tenth party congress the agencies of war communism including the local expert commissions began to lose influence, and central TsSU succeeded in regaining control over their local agents. As early as November 1921 the collegium of TsSU affirmed a proposal made by P.I.Popov to order the local correspondents to send their reports directly to GSB and not to the local Uezd statistical bureau . This would have effectively by-passed the uezd expert commissions which had been the crucial operational centre for orienting grain procurements. Copies were presumably sent to UEK. And the UEK still had first call on the data of the local volost and uezd statisticians. Here the main problem was to ensure that all the local data were

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1. See Trudy TsSU, Tom VIII, vyp.1, M.1921, p.275.
2. See Byulleten TsSU, 1922, no.59, p.36.

forwarded to Dubenetsky's department at the centre without corrections being applied en route. The procedure that ultimately emerged for passing on these data was as follows:

All the information on the preliminary yield statistics which had been collected by the volost statisticians was compiled in the uezd statistical bureau. It was then sent first to the Uezd Expert Commission (UEK) before being sent on to GSB[1]. The local subjective evaluations of the state of the crop were made by the correspondents and local statisticians on the first and fifteenth of each month after the vegetation season had begun. The deputy director of ustatburo (USB) was supposed to address the uezd Expert Commission (UEK) and present the results of these subjective evaluations on the second and the sixteenth of each month. These would be considered in the light of other data from other sources — NKFin data, NKZem data etc. And the results together with the conclusions of the UEK and opinion of USB were then supposed to be telephoned to GSB on the same day, while the materials and account of the discussion were to be sent on by post.

This scheme and its timetables were very tight. Each uezd was to receive data from 20 volosts. And there were on average well over 40 different investigations for each volost. The volost statistician and correspondents supplied on average about 26 different sets of figures, the NKProd and NKFin agents supplied about 6 each, a further 4 came from the NKZem agents. All this and more material was to be sifted through and evaluated in one day before the results were telephoned to GSB.

GSB was to compile the uezd results and to send both the uezd totals and the gubernia summaries to central TsSU by telegram on the third and the eighteenth of each month. The summaries were to be sent in two

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1. For this account see N.I.Dubenetsky, V.S., 1923, no.7-12, p.202.

forms a) without any correction and b) with the correction as given by the expert commission. Dubenetsky insisted on this.

Some delay must have been expected because Dubenetsky states that all these data would have been received by his department in Moscow by the tenth and twenty-fifth of each month. The final All Union grand summary was then presented to TsSUs own Central Expert Commission on the fifteenth and thirteenth of each month and then published.

Altogether data were collected from well over 10,000 agents and correspondents in over 6,000 volosts and this was repeated twice every month throughout the growing season until the harvest.

Reporting on this work in 1923 Dubenetsky stated that he felt that the coverage of the primary agents was satisfactory but that there was still need to further unify the methods of investigation and to provide a more strict division in the accounting between raw material and the corrections of the expert commissions.

The method of converting these local subjective evaluations into physical terms had at first been left to the local GSB and the local expert commissions. The local GSBs tended to use the procedure and conversion systems that they had used before the Revolution. But towards the end of 1921 and the beginning of 1922 B.S.Yastremsky carried out a detailed investigation of all the available pre-revolutionary conversion scales which could be used throughout the country[1].

The basic outline of these scales is given below[2]:

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1. B.S.Yastremsky 'The quantitative expression of the subjective characteristics of the harvest', first published in V.S. 1922, no.5-8 and reproduced in his selected works. B.S.Yastremsky, Izbranniye Trudy , M.1964, pp.290-326. The detailed conversion tables are given on pp.324-26. These tables were first reported to the 2nd All Russian Statistical Congress in March 1922.

2. Source: B.S.Yastremsky Izbranniye Trudy , M.1964, p.326 where the point divisions are given to one decimal place. See also Trudy TsSU, Tom.VIII, vyp.3, M.1922, p.343.

Regional Scale (%)

Point	I	II	III	IV	V	VI
1. Poor	50	45	40	34	29	24
2. Lower than average	75	71	67	64	60	56
3. Average	100	100	100	100	100	100
4. Higher than average	125	130	137	144	150	156
5. Fine	150	165	180	194	209	224

100% refers to the average 1900-1913 yields in the given region. The regional groupings I-VI were very complex but basically the Northern Consumer Region was the only region in group I, the Southern Producer Region and most of the Central Producer Region excluding Lower Volga spanned groups II-V, the Lower Volga and Kirgizia were in group VI[1]. Drought was the major factor causing harvest fluctuations and these regions correspond roughly to their moisture sensitivity.

Until 1919 the data from these sources were presented without any corrections. In 1920, as already mentioned, the procedure in many areas was to allow the local 'expert' commissions to make corrections, which they did in a rather arbitrary fashion. These corrections were removed by TsSU as soon as it became possible to do so. And the TsSU began presenting yield data uncorrected and with the addition of various levels of correction.

In the early published accounts of the 1921 yields it was explained that two corrections were required to the yield data, a 10-12% correction for the under-estimation of pre-revolutionary TsSK data and about 10-15% due to the under-estimation involved in the subjective evaluations of the yield, i.e. about 23% correction in all.

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1. For a more detailed listing of the regions covered in each of these VI groups see B.S.Yastremsky, Izbrannye Trudy, Tom VIII, vyp.3, M.1922, p.343.

It was explained that the correction to the subjective evaluation could be made by adding something between a 0.25 point and a 0.5 point correction. These would affect the average level in the different regions in the following way[1]:

The effect of adding a correction of

Region	0.25 points	0.5 points
I	6.5%	13%
II	7.5%	15%
III	9.0%	18%
IV	10.0%	21%
V	12.0%	24%
VI	13.5%	27%

From this it follows that the more stable regions in the Northern Consumer Region would have a lower percentage correction applied to them than the less stable regions if a simple 0.25 or 0.5 point correction were added.

The effect of these point corrections would also be different depending on the initial level of evaluation. In the table below I have calculated the effect of adding a ½ point correction to evaluations of 1,2,3 and 4 for the six regions.

The effect of adding a ½ point correction[2]

Initial evaluation	I	II	III	IV	V	VI
Point 1	+26.0%	+28.9%	+32.5%	+41.2%	+48.2%	+62.5%
Point 2	+17.3%	+19.7%	+23.9%	+26.6%	+31.7%	+37.5%
Point 3	+13.0%	+15.0%	+18.0%	+21.0%	+24.0%	+27.0%
Point 4	+10.4%	+13.1%	+15.3%	+16.7%	+18.7%	+20.5%

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1. Source: Trudy TsSU, Tom VIII, vyp.3,N.1922, pp.344-5. This is using Yastremsky's conversion table described above.

2. Source: Calculated from scales given by B.S.Yastremsky in Izbranniye Trudy, M.1964, p.326.

As can be seen, the lower the initial evaluation the higher the correction that was applied to it.

The ½ point (or any other point) correction was therefore one which had a highly differentiated effect, despite its apparent crudity.

Until 1923 there was some uncertainty as to whether a 0.25 point or a 0.5 point correction should be applied to subjective evaluations, but after this time it was decided to apply the 0.5 point correction to account for both the level of pre-war under-estimation and for the current extra underestimation[1]. This half point correction was then applied to all subjective evaluations throughout this period. It found a partial justification in Yastremsky's analysis of pre-war data[2]. Later comparisons with the results of NKZ experimental stations with the results of budget studies and the qualified correspondents' reports were to be invoked as its justification. But in 1923 when it was introduced there can be little doubt that it was the pressure from Groman and Strumilin constructing rough overall utilisation balances which were causing the TsSU collegium to anxiously look around for a respectable way of correcting their basic data.

However many disadvantages the ½ point correction had, and however crude it may have been, it was at least more refined than the application

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1. See Trudy TsSU, Tom VIII, vyp.4, M.1923, p.470.

2. Yastremsky's data apparently indicated that over a lengthy period even in normal pre-war times the subjective preliminary harvest evaluation tended to be about half a point above the subjective final harvest evaluation. The former averaged around point 3 on the 5 point scale while the latter averaged around point 2½. See B.S.Yastremsky, ibid., pp.295-6. Concerning this relationship Yastremsky wrote: 'It is not possible to state that this relationship was a general rule without any exceptions. But we must note that this phenomenon was observed in all those gubernii which had the best observations'. B.S.Yastremsky ibid., p.248.

across the board of a crude percentage correction based on a rather dubious all union utilisation balance. It was also less arbitrary than the subjective evaluation made by the local expert councils under the domination of local procurements agents.

For 1923 the official yield evaluation was still made initially by converting the final preliminary subjective evaluations (made on 1st and 15th of August) into physical quantities after adding a 0.5 point correction. Data were collected by 22,179 correspondents[1].

The official notes to the Trudy TsSU providing data on the 1923 yield[2] state that the 0.5 point correction was composed of two parts, a 0.3 point correction to account for concealment due to the fiscal nature of the data and a 0.2 point correction to account for the normal underestimation of the yield when evaluated from the harvest prospects. The notes go on to explain that these figures might still be 6-7% below reality just as TsSK data were lower than the data of the former ministry of agriculture.

The official TsSU account of the 1924 harvest states that the evaluation of yield was again based upon the subjective evaluation of the harvest prospects, which were made at the time of harvest. But it adds

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1. They comprised the following:

Volost statisticians	5,404
Voluntary correspondents	7,419
Food organs and agents	3,304
Land organs	1,274
Volost expert commissions	3,098
Other	1,680
All	22,179

See Trudy TsSU, Tom VIII, vyp.5, M.1924, p.187

2. See Trudy TsSU, Tom VIII, vyp.5, M.1924, pp.186-7.

that in those regions suffering from drought and harvest failure, a special procedure was instituted whereby the volost expert commissions evaluated the scale of harvest losses. Overall a correction of 0.4 to 0.6 points was added to the subjective evaluations, but most regions also had an additional correction of 8% which it was claimed was made 'due to the proposition that in years of harvest failure the under-estimation of the yield would be larger than normal'[1]. It was also claimed that the resulting figures were then verified by checking with the results of grain forage balance[2].

These were rather strange arguments for TsSU to use. As has been explained above, the system of applying point corrections already involved applying a greater proportion of correction to lower yield evaluations than to higher ones. An addition of a further 8% does therefore seem somewhat arbitrary. The argument that such a level was justified by checking with the results of a grain forage balance was contrary to the manner in which TsSU had been arguing about the validity of using utilisation balances in relatively normal years.

No detailed account of how the preliminary evaluation of the 1925 harvest was made have ever appeared. A general revision in the procedure of grain evaluation came about in 1926. The last pre-reform account of yield evaluations which appeared in 1926 only covers yields in 1923 and 1924[3]. The 1925 yields as given at this time in other less detailed statistical handbooks[4] give no account of the sources for these data or how they were calculated. Since the preliminary 1925 data given in these 1925 statistical sources were considered by TsSU to be comparable with the data for 1923 and 1924, I assume that the methods of calculating them were similar.

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1. See Trudy TsSU, Tom VIII, vyp.7, M.1926, p.161.
2. See Trudy TsSU, Tom.VIII, vyp.7, M.1926, pp.161-2.
3. See Trudy TsSU, Tom VIII, vyp.7, M.1926.
4. e.g. Abrégé des données statistiques de l'URSS , M.1925.

b) Grain yield data 1918-1925 (based on subjective evaluations)

The first published yield data for 1920 were based on the data which had in many cases already been adjusted by the local expert councils[1].

At the time of the publication of these figures TsSU warned that they might still be a little lower than reality due to the pressures to conceal production in the face of requisitioning. But nevertheless TsSU did conclude that

> Taking into consideration all the unfavourable conditions of the time, the figures for gross production (based on these yield figures) nevertheless in general reflect agricultural reality[2].

The results of these evaluations were only published in a highly disaggregated form. And at first they were compared with the pre-revolutionary data covering the post revolutionary yield data with the pre-revolutionary data for peasant land only. This provided a slightly more favourable indication of post revolutionary yields. These figures are given in the table below; *in tsentners per hectare:*

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1. See Trudy TsSU, Tom VIII, vyp.1, M.1921, p.275, where it specifically states that subjective evaluations had been converted into concrete values at GSB using a yield scale. But that in questions of doubt GSB had to take into account the opinion and conclusions of the expert commissions which had to contain representatives of Gubprodkom, Gubzemotdel and other administrative agencies.
2. Trudy TsSU, Tom.VIII, vyp.1, M.1921, p.275.

	RSFSR					UkSSR				
	Winter Rye	Spring Wheat	Oats	Bar-ley	W Wheat	W Rye	Spr. Wheat	Oats	Bar-ley	W Wheat
1905/14 M.Agr.All	8.02	7.27	7.96	7.95	9.16	10.98	8.60	10.79	10.13	11.57
Peas.	7.06	6.50	7.23	7.42	7.43	8.66	6.91	8.98	8.95	9.13
1905/14 TsSK All	6.55	6.55	6.92	7.04	7.81	9.08	7.67	9.86	9.01	10.82
Peas.	6.79	6.31	6.70	6.97	7.43	7.46	6.50	8.71	8.39	8.92
1909/13 TsSK	5.72	5.95	7.64	8.23	8.50	9.49	7.12	10.51	9.89	10.46
1914 TsSK	6.94	6.64	6.32	7.06	7.33	9.85	4.23	9.79	7.06	10.09
1915 TsSK	8.93	6.19	7.39	7.94	7.60	9.97	6.49	8.53	7.58	13.86
1916 M.Agr.	8.11	4.08	7.00	6.38	7.09	11.04	5.48	11.64	7.33	12.29
1917 M.Agr.	6.32	5.44	6.37	6.46	8.71	9.05	7.30	8.83	8.32	10.54
1918 TsSU	6.61	5.40	6.72	5.56	7.13	6.77	3.69	4.86	3.91	7.54
1919 TsSU	5.74	5.32	5.99	5.72	5.14	8.60	5.19	9.38	9.07	7.04
1920 TsSU*	(5.05)	(4.27)	(5.35)	(4.95)	(4.96)	(4.44)	(5.70)	(7.04)	(6.50)	(3.93)

Sources: 1909/13, 1914-17, Trudy TsSU, Tom XVIII, M.1924 pp.128,148.

1905/14 (all), 1918-1920, Trudy TsSU, Tom VIII, vyp.1, M.1921 pp.244-55.

1905/14 (peasant) Trudy TsSU, Tom VIII, vyp.2, M.1922, pp.362-6

Notes: The five grains given in the table cover 90% of all grains, The 1920 figure given in brackets has been corrected by local expert commissions and will be discussed in more detail below.

In order to ease comparison I have made a rough attempt to aggregate these data into a roughly comparable series of figures indicating the level of yield for the five main grains for the areas of the RSFSR and UkSSR taken together. These aggregated figures are presented below[1] and appear in column 1 of the introductory table Y1.

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1. See appendix for a description of the aggregation procedure and the assumptions made.

Grain yield for five main grains in tsentners per hectare

	RSFSR	UkSSR	RSFSR & UkSSR
1917	6.20	8.92	6.86
1918	6.11	5.44	5.95
1919	5.66	7.99	6.25
1920	(4.90)	(5.40)	(5.03)

Notes: The five main grains are: Winter Rye, Spring Wheat, Oats, Barley and Winter Wheat.

The 1920 yield figures refer to figures containing a correction made by the local expert commissions and will be discussed in more detail below.

These figures indicate that the 1920 yield was substantially lower than the 1919 yield (by about 20%) being about 14% lower in the RSFSR and all of 32% lower in the UkSSR.

However, as explained above these data are somewhat incompatible. The 1920 data contain a correction made by the local expert commissions in some areas, whilst the data for earlier years do not. We may expect therefore that the 1920 data are somewhat higher than they should be, to be comparable with the earlier uncorrected data.

Later uncorrected figures for the 1920 yield were published and did indeed indicate a lower figure. But this did not apply for all regions, as the following table shows.

in tsenters per hectare

	RSFSR	UkSSR	RSFSR & UkSSR
1920 (1921 source)	4.90	5.40	5.03
1920 (1923 source)	3.70	6.63	4.47

Sources: 1921 source from Trudy TsSU, Tom VIII, vyp.1, M.1921 pp244-50

1923 source from Trudy TsSU, Tom VIII, vyp.4, M.1923, p.393.

Notes: All these data were given in a disaggregated form and have been aggregated by me as indicated in the appendix.

The subsequent uncorrected yield data for 1920, excluding local expert corrections, but centrally converted into physical units, indicates

an overall yield level about 11% lower than earlier indicated. But this was composed of a level 24.5% lower in the RSFSR and 22.8% higher in the UkSSR. Presumably the decrease in the yield level in the RSFSR would be explained in terms of the removal of local expert commission corrections in the areas which had been experiencing razverstka for several years, whilst in the newly liberated Ukraine with little experience of centralised conversion scales might have been more important. But nevertheless the reasons for such a large inflation to the 'uncorrected' UkSSR data are highly uncertain.

In 1923 two new series of grain yield figures were published covering the years 1920-1923. Both excluded local expert commission corrections and both used a central Yastremsky conversion scale. But one was given without any further correction while the other was given with a 0.5 point correction. These two series are given in the following tables and they appear in columns 2A and b of the introductory table Y1 and as source 3b in table Y2.

Grain yields in tsentners per hectare

	Winter Rye	Spring Wheat	Oats	Barley	Winter Wheat	other	All grains	In point evaln	Point evaln +0.5 point	Corr-ected evaln.
RSFSR										
1920	3.75	2.87	4.71	4.95	5.26	-	3.88	1.8	2.3	4.62
1921	3.67	2.85	4.17	4.35	2.89	-	3.58	1.6	2.1	4.21
1922	6.09	5.02	6.45	6.54	8.71	-	5.86	2.7	3.2	6.96
UkSSR										
1920	5.98	5.26	8.54	6.61	5.50	-	6.33	2.4	2.9	7.60
1921	7.64	2.43	6.33	2.97	4.23	-	5.05	1.8	2.3	6.00
1922	8.75	6.81	9.28	9.10	6.55	-	7.78	2.8	3.3	9.28
RSFSR & UkSSR										
1920	4.21	3.28	5.31	5.98	5.41	-	4.56	2.0	2.5	5.44
1921	4.48	2.76	4.56	3.45	3.70	-	4.02	1.8	2.3	4.73
1922	6.67	5.38	6.97	7.84	7.33	-	6.40	2.7	3.2	7.60

	NCR	SCR	SPR	CPR	EPR	All USSR less SCR
1920 uncorrected	5.4	-	6.2	3.1	3.9	4.6
+ ½ point	6.1	-	7.4	3.7	4.6	5.4
1921 uncorrected	6.0	-	4.7	2.5	3.9	4.0
+ ½ point	6.8	-	5.6	3.0	4.6	4.7
1922 uncorrected	5.9	-	7.8	5.4	5.8	6.4
+ ½ point	6.7	-	9.3	6.1	6.9	7.6

Source: Trudy TsSU, Tom VIII, vyp.4, M.1923, p.393.

As has already been described, the figure which appeared in the 1923 volume of Trudy TsSU for the uncorrected 1920 yield was about 11% lower than the earlier locally corrected figure. But when the ½ point correction was applied to this figure it became larger than the earlier evaluation.

1920 grain yields RSFSR and UkSSR in tsentners per hectare from various sources:

1921 source	5 grains	5.3	100%
	all grains	-	
1923 source	5 grains uncorrected	4.47	89%
	all grains uncorrected	4.56	89%
1923 source	5 grains +0.5 point	-	
	all grains + 0.5 point	5.44	106%

Sources: 1921 source Trudy TsSU, Tom VIII, vyp.1 pp246-50.
1923 source Trudy TsSU, Tom VIII, vyp.4, p.393

If we look now at figures for other years given in the above tables we see that the 1921 harvest yield was significantly lower (12-13%) than the 1920 yield overall. It was lower for all grains apart from Winter Rye (which rose by 6%), and it was lower in all regions apart from NCR and EPR. The yield rose in the NCR by 11% in 1921 and was stable in the EPR. The lowest of all levels was recorded in the CPR, 2.55 tsentners per hectare uncorrected and 3.05 tsentners per hectare with ½ point correction. This was the area suffering the most from the drought and famine of 1921. In the following year there was a marked improvement in the overall level of yield 6.47 tsentners per hectare. This consisted of a marked improvement in the yield of all grains overall, and in all regions, apart from NCR which was only slightly lower 1-2%.

Unfortunately we can be far less certain as to the dynamic in 1923. The 1923 yield data have never been published in a series together with the 1922 and earlier data and the regionalisations were changed in that year. 1923 was a low harvest year.

The initial figures for yield in 1923 which were published in 1924 indicated a level of yield significantly (about 20%) lower than the 1922 level (See also column 2a & b in table Y1 and source 3c in table Y2).

	Uncorrected evaluation in tsentners per hectare	evaluation in points	Evaluation in points +0.5 point correction	Corrected evaluation in tsentners per hectare
USSR -SCR 1922 (1923 source)	6.40	2.7	3.2	7.60
1923 (1924 source)	5.11	2.2	2.5	6.22
% decline	79.8%	81.5%	78.1%	81.8%

Sources: 1922 in 1923 source from Trudy TsSU,Tom VIII,vyp.4,M.1923,p.393
1923 in 1924 source from Trudy TsSU,Tom VIII,vyp.5,M.1924,p.138

The regional differences also indicated a substantial decline in all regions:

	NCR	SCR	SPR	CPR	EPR	USSR-SCR
No correction						
1922 (1923 source)	5.9	-	7.8	5.4	5.8	6.4
1923 (1924 source)	5.1	-	7.2	3.9	4.1	5.2
Including 0.5 point						
1922 (1923 source)	6.7	-	9.3	6.1	6.9	7.6
1923 (1924 source)	5.7	-	8.7	5.0	5.2	6.4

Sources: see appendices.

It is far more difficult to analyse the dynamic by grain, because of the change in emphasis between the two sources. Although both sources gave the overall yields and regional yields with and without the 0.5 point correction, the 1923 source only gave the yield data differentiated by grain

without a correction, whereas the 1924 source only gave the yield data differentiated by grain with the 0.5 point correction.

In the sources published in 1925 and 1926 no uncorrected yield data at all was given. And the corrected data was much (about 11%) larger than the earlier data, where it was possible to compare it (i.e. for 1923).

The 1925 source 'Abrege des donnees statistiques de l'URSS,' which was produced specially for the XVI session of the International Institute of Statistics, contains regional data on grain yields for 1923, 1924 and 1925 for the four main grains and the average for all grains. The figures for 1923 and 1924 from this source are the same as those from the much more detailed source, Trudy TsSU, Tom VIII, vyp.7, M.1926.

The different regional figures for 1923 yields from these sources are given in the following table:

	NCR	SCR	SPR	CPR	EPR	USSR	USSR-SCR
1923							
1924 source	5.7	-	8.7	5.0	5.2		6.4
1925 source	6.8	-	8.8	6.0	6.3		7.1
Difference	19.3%		1.1%	20%	21.2%		10.9%

Sources: see appendices

Most regions appear to have had an inflation of about 20% apart from the SPR which was only increased by 1%. It is very tempting to relate these corrections to those mentioned above which were applied to the 1920 yield data in 1923. In 1923, the UkSSR data were inflated by over 20% whilst those for the RSFSR were decreased. As was mentioned above the reasons for this highly differential inflation were very uncertain, but they do appear to have been removed in 1925, when all the other regions received an equally unexplained inflation of about 20%.

The explanation for this curious phenomenon is probably very simple. Before 1924 TsSU (RSFSR) and TsSU (UkSSR) were independent organisations. Both of them were facing considerable pressure from Gosplan and the procurement agenices to inflate the level of their grain evaluations. TsSU (RSFSR) under Popov's leadership appears to have resisted the inclusion of any additional correction (beyond the half point) in its published yield data until 1925. This was despite the fact the TsSU had since July 1923 acknowledged that a much larger correction to the overall production data was required than indicated by their current sown area and yield data[1].

TsSU (UkSSR) however, would probably have had a weaker political leadership, and would probably have faced more seriouspressure than TsSU (RSFSR) simply because it covered a major grain producer area. It is therefore quite probable that TsSU (UkSSR) was forced to give way and apply these higher corrections from a much earlier date[2].

If we assume therefore that the data for the UkSSR in the SPR already since 1923 contained a correction of some 20% above the half point correction, it would then follow that this 1925 source provided values which indicated a 20% correction in all regions above the 0.5 point correction, i.e. we are dealing with a level of overall correction coefficients of about 40%.

Whereas the 0.5 point correction was applied in a fairly sophisticated manner the application of the additional 20% correction appears to have been far more arbitrary. The main justification for it appears to have been an overall utilisation balance. But this could not have indicated whether the correction should have been added to the sown area data or the yield data.

The series of yield data with these very large levels of correction are given in the following table:

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1. See below p.307.
2. This explanation is offered as a hypothesis. I have not analysed TsSU (UkSSR) materials for this period; such an investigation would provide the necessary evidence on this point.

in tsentners per hectare

	Rye	Wheat	Barley	Oats	Others	Average
1905-14	7.0	6.8	8.0	7.5	7.0	7.1
1923	7.4	6.5	7.3	7.2	7.0	7.1
1924	6.5	5.4	5.4	6.3	5.6	6.0
1925	7.7	8.7	10.2	8.7	8.2	8.4

	NCR	SCR	SPR	CPR	EPR	USSR	USSR-SCR
1916	6.3	-	8.2	6.9	7.2	-	7.3
1923	6.8	-	8.8	6.0	6.3	-	7.1
1924	7.2	9.6	6.3	4.4	7.3	6.1	6.0
1925	7.4	-	10.7	6.7	7.9	-	8.4

Source: Abrégé des données statistiques de l'URSS M.1925, pp.62-5. And see appendix.

From these figures it can be seen that the overall yield in 1923 was considered to be about average in comparison with 1916[1], probably somewhat higher in NCR and SPR and lower in CPR and EPR. The overall yield in 1924 appears about 15% lower than this level, due to a much lower than average yield in the SPR and CPR that cannot offset the slightly higher than average yield in the NCR and EPR. 1925 however appears as a bumper harvest for all grains in all areas.

Before leaving this period, some mention must be made of the important TsSU work on the balance of the National Economy which appeared in 1926. This contained the most detailed production and utilisation data for grain that had been worked out at this time. The years referred to were 1923 and 1924, and it must be noted that the yield figures given were totally comparable with Abrégé M.1925 and Trudy TsSU, Tom VIII, vyp.7, M.1926. We will return to consider the utilisation data from this source in more detail later on.

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1. Given the level of annual fluctuations, it would have been much better to have supplied data for an average pre-war period rather than for just one year.

c) Post harvest evaluations of yield 1921-1929

Data on the final results after the harvest were collected from several sources. The most important mass source of data was the special investigation carried out by the local statistical agencies in the autumn - the so called autumn investigation (opros). Other sources included the rather limited number of investigations carried out by the experimental stations of NKZem, the data supplied by the special qualified correspondents network (8,500+) that was formed in 1925, the data received from the peasant budget investigations (about 10,000 households), and the results from the mass control measurement of reapings and threshings.

Initially the autumn investigation data and other data were compared with the preliminary subjective evaluations which had been corrected by the inclusion of the half point. The autumn investigations data and the data from the qualified correspondents network were cited at first as demonstrating the justification for the half point correction to the preliminary subjective evaluations. Later the budget data and control measurements of threshings and reapings (with the inclusion of 'ozadki'[1]) were cited as demonstrating that a much larger correction was required. In 1929 the Expert Council adopted a procedure whereby a correction roughly equivalent to the half point was applied to the results of the autumn survey. This would appear to be equivalent to the addition of two half point corrections to the preliminary subjective evaluations i.e. probably about 40% overall.

An account of the different methods of collecting post-harvest data is given below together with a comparison of the results from these different sources

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1. See later.

The Autumn Investigations

An autumn investigation was carried out every year from 1921 - 1929. Initially it was carried out by the local statisticians but by the late 1920s it was proposed to place a larger share of the burden of this work onto the correspondents' network.

The autumn investigation was a much more complex investigation than the spring one[1] and consequently covered a smaller proportion of peasant households. The survey never covered more than 10% of the peasant households and its coverage fell after 1925, so that in 1926 it only covered 3%, in 1927 only 2.5% and in 1928 only 2%[2]

The size of winter sowings was included in this investigation, but this was only a minor item used to check the spring accounts of winter killings; the major concern was with the size of yield.

Dubenetsky informs us that in 1921 the autumn survey only gave satisfactory results in the consumer regions, where they indicated a level of yield of 6-8% higher than that given by the final subjective evaluations. However, in the producer regions where the grain requisitioning was more serious the final autumn survey figures were 30% lower than the final subjective evaluations and for the Ukraine as much as 50% lower[3].

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1. See above p. 47 for an account of the spring survey.
2. See Den, Istochniki vazhnyeishei otrasly statistiki narodnogo khozyaistva SSSR L.1929, p.57. Dubenetsky in Urozhai khlebov i trav v 1925 i 1926g., M.1929, p.VI states that the figure of 3% for 1926 was the target and that in fact only 561,776 replies were received, which was only 2.6% of all households. Apart from this the distribution was very bad. In the Ukraine there was only a 1.8% coverage. Compare this with the misleading account of A.M.Bryansky, who, in Istoriya Sovetskoi Gosudarstvennoi Statistiki, M.1960, p.118 reverses the order to claim a 2% coverage at the beginning of the 1920s and 5% later. I.F.Mirinov, in Vyborochnoe nablyudeniye, M.1960, p.127, gives the correct scale of operations.
3. N.I.Dubenetsky, V.S. 1923, no.7-12, p.205.

In 1922 there was an improvement. The results of the autumn survey in the consumer regions were then about 10% higher than the final subjective evaluations. In most of the producer regions they were about equal to the final subjective evaluations, but in the Ukraine and Siberia, however, they remained lower.

From these comparisons it was concluded that the effect of the experience of requisitioning in the producer regions was still having a serious effect on the results of the final investigations made in the autumn survey and therefore that it was safer to base the estimations of final yield on the final subjective evaluations but with corrections added.

Dubenetsky later reported that the 1923 results were much more favourable and he was quite optimistic about the improving reliability of the data from this source:

> Earlier as you remember we had a very pessimistic evaluation of the data from the autumn investigation but the experience of 1923 must make us change this evaluation. Perhaps 1923 gave different results because the investigation was carried out later in autumn when the tax threat had already passed. If this is so then the present change in taxation system away from a tax on the yield allows us to hope that in not too distant years we will be able to get much more reliable autumn investigation data from the population and do without these large corrections[1].

As it turned out Dubenetsky's optimism was not generally accepted. As we shall see in the later years, as the data from other sources became available a level of yield was accepted implying an even greater level of

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1. N.I.Dubenetsky, speech to the collegium of TsSU 25, January 1923, See Byulleten TsSU, no. pp.81-2.

correction than that which was being applied in the early 1920s.

The available data for 1925 and 1926 showed the following relationships between the Autumn investigation and local subjective evaluations for Winter Rye

in tsentners per hectare

	1925			1926		
	Autumn Invest.	Subj. evaln.	Autumn as % of Subj.	Autumn invest.	Subj. evaln.	Autumn as % of Subj.
1. NCR						
RSFSR	6.57	6.97	94.3%	6.75	7.33	92.1%
BSSR	6.60	6.90	95.7%	5.61	5.53	101.4%
2. SPR						
UkSSR	7.77	8.70	89.3%	6.96	6.72	103.6%
	7.67	-	-	4.09	4.75	86.1%
4. CPR	5.20	5.67	91.7%	6.34	7.53	84.2%
5. EPR						
Sib.kr.	6.45	6.61	97.6%	6.91	7.24	95.4%

Source: computed from Urozhai khlebov i trav v 1925 i 1926 gg. M.1929, pp.XI, XII.

As I understand these data the local subjective evaluations made at the time of first threshings already contained a 0.5 point correction and therefore the results of the autumn survey for 1925 at least are quite close to the 0.5 point corrected data. They are less than 5% lower in the NCR and EPR, although more like 10% lower in the major producer areas of UkSSR and CPR. The 1926 results show a slight deterioration in the reliability of the autumn data for the CPR.

I will return to discuss the application of corrections to the autumn survey data, as it emerged in 1929, after I have discussed the other sources of data collected in the 1920s.

NKZem experimental stations' data.

According to Obukhov the results of the 1924 autumn survey yield evaluations were compared with the yield evaluations made in the area of 100 experimental agricultural and meteorological stations and the results of the 1925 autumn investigations were compared with evaluations made by 200 stations. These were the first large-scale control materials that were available and they indicated the need for a ½ point correction to be made to the autumn investigation data. Obukhov argued that although 100-200 comparisons were sufficient basis to justify a correction to the all union data, they were nevertheless far too few to justify any regional differentiation in the correction[1]. In order to provide better differentiated corrections, mass control data would be required, like the qualified correspondents' data (8,500) or the budget studies (10,000).

Data from the qualified correspondents' network

A network of 8½ thousand of the more reliable and more experienced qualified correspondents was created in 1925 on the proposal affirmed by the 2nd All Union Statistical Conference in February 1925. These were to report directly to central TsSU and thereby by-passed the local agents of the administration who were already putting pressure on the local correspondents and statisticians[2].

The correspondents were instructed to send in data on the yields in their own households but also to provide an indication of the average level of yields in their village. A comparison of the data the qualified correspondents sent in for 1925 indicates that in their own evaluation, their own level of yield was somewhat higher than the average 1925[3] yields.

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1. See V.M.Obukhov, Byulleten TsSU, 1926, no.118, p.93.
3. Source: V.M.Obukhov, Byulleten TsSU, 1926, no.118, p.86.
2. This move was opposed by Yakovlov of NKRKI, who wanted to increase local control over these local statisticians. See S.G.Wheatcroft, (1974) ibid., p.37.

(in tsentners per hectare)

	Winter Rye	Winter Wheat	Spring Wheat	Oats	Barley	Millet	Buck-wheat	Maize
Correspondents household	7.66	8.36	6.62	8.20	7.90	7.99	6.40	15.50
Average household	7.55	8.06	6.56	8.08	7.69	7.93	6.41	15.06
% + or -	+0.7%	+7.0%	+0.4%	+0.8%	+1.4%	+0.4%	-0.1%	+2.9%

What partial data we have for later years indicates that by 1928 the qualified correspondents were indicating an even larger gulf between their own and the average yield for all households, in tsentners per hectare:

	Qualified Correspondents		
	Own Household	Assessed Average	%%
1. NCR			
Tsent Prom R.	10.37	9.52	108.9%
Zapadnyi R	8.50	7.64	111.3%
3. SPR			
UkSSR	7.69	7.37	104.3%
4. CPR			
Tsent Chernozem	6.52	6.23	104.7%
Nizh.Volzhskii	6.35	6.19	107.6%
Sred. Volzhskii	7.31	7.16	107.1%
Bashkir ASSR	7.84	7.57	103.6%
Vyatskii R.	8.33	7.78	107.1%
5. EPR			
Urals	9.41	8.53	110.3%
Sibirsk	8.12	7.73	105.0% [1]

The qualified correspondents were instructed to make two evaluations. Both were to be in physical terms. The first was to be at the time of the first threshings and the second was to be at the time of the completion of harvesting.

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1 Source: M.Yurtsovskii, SO., 1929, no.5, p.119. Note these figures do not refer to all the qualified correspondents in the given areas, but only to those covered by control measurements of thrashings and reapings.

Obukhov's first report on the results of the qualified correspondents' network was worked out before their post harvest results were available and so only covered their last preliminary harvest evaluation. Nevertheless it indicated a level of yield only 5% below the corrected TsSU preliminary harvest results and therefore Obukhov was able to claim that it justified most of the 0.5 point correction. The results of this comparison are given overleaf.

1925 yields centsentners per hectare	8 grains	Rye	Winter Wheat	Spring Wheat	Oats	Barley	Millet	Buckwheat	Maize
TsSU calculation corrected with ½ point	7.84	7.22	9.08	8.03	8.26	9.61	6.34	5.08	14.04
Correspondents data	7.43	7.00	8.44	7.10	7.27	8.98	6.58	5.95	14.85
+ or - in tsentners/hectare	-0.40	-0.22	-0.64	-0.93	-0.99	-0.63	+0.24	+0.87	+0.81
+ or - in %	?4.2%	?3.1%	-7.1%	-11.6%	-12.0%	-6.6%	+3.8%	+17.1%	+5.8%

Source: V. M. Obukhov, Byulleten TsSU, 1926, No. 118, p.86. Note the figures in this table have been weighted according to the sown area in the different regions to make them more comparable with the TsSU data. In the earlier table the correspondents' data had been given unweighted and this explains the difference between the two series.

Much more data from the qualified correspondents became available with the publication of materials on the 1925 and 1926 harvest in 1929. These materials present a rather disturbing view of the reliability of the data from this source.

The differences between the preliminary and the final evaluations of the qualified correspondents are very large and often are large in an unpredictable manner.

in tsentners per hectare

	1925			1926		
Winter Rye	Prel.	Final	Prel/ Final	Prel.	Final	Prel/ Final
1. NCR						
RSFSR	6.99	7.45	93.8%	7.11	7.51	94.7%
BSSR	6.78	6.54	103.7%	5.76	6.03	95.5%
2. SCR						
3. SPR						
UkSSR	9.15	8.80	104.0%	7.69	7.64	100%
	4.76	4.48	102.9%	4.90	4.74	103.4%
4. CPR	5.80	6.03	96.2%	7.51	7.57	99.2%
5. EPR						
Sib.kr.	7.00	7.60	92.1%	7.17	7.92	90.5% [1]

1. Source: Computed from Urozhai khlebov i trav v 1925 i 1926gg. M.1929, pp.XI, XII.

In the following table I have compared the local subjective evaluations with the final qualified correspondents' evaluations:

Winter Rye	1925 Local subj. evaln.	1925 Final Qual Corresp.	1925 Final Qual. corr. Local subj.	1926 Local subj. evaln.	1926 Final Qual. Corresp.	1926 Final Qual. corr. Local subj.
1.NCR						
RSFSR	6.97	7.45	106.9%	7.33	7.51	102.5%
BSSR	6.90	6.54	94.8%	5.53	6.03	109.0%
2.SCR						
3.SPR						
UkSSR	8.70	8.80	101.1%	6.72	7.69	114.4%
	-	9.48	-	4.75	4.74	99.8%
4.CPR	5.67	6.03	106.3%	7.53	7.57	100.5%
5.EPR						
Sib Kr.	6.61	7.6	115.0%	7.24	7.92	109.4% [1]

The final qualified correspondents'data normally vary from between 1 to 15% above the level of the local subjective evaluation corrected with the 0.5 point and overall would be about 6% higher.

Unfortunately no later data are available to compare local subjective evaluations with correspondents' data. But it is possible to make a partial comparison of correspondents' data and autumn survey data for 1928. This is described below:

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1. Source: Computed from Urozhai khlebov i trav v 1925 i 1926 gg. M.1929, pp.XI, XII.

in tsentners per hectare

1928	Autumn Survey	Qual.Corr. assessed average	Qual.corr. Autumn Survey
1. NCR			
Tsent Prom	8.54	9.52	111.5%
	7.55	7.64	101.2%
3. SPR			
UkSSR	6.52	7.37	113.0%
4. CPR			
Tsent Chernozem	5.72	6.73	108.9%
Nizh Volzhsk	5.75	6.19	107.7%
Sred Volzhsk	-	7.16	-
	7.28	7.57	104.0%
	8.30	7.78	93.7%
5. EPR			
Urals ob	8.38	8.53	101.8%
Sib kr.	6.02	7.73	128.4% [1]

Since the Autumn survey data were normally (in 1925 and 1926) about 10% lower than the ½ point corrected subjected evaluations, the above results would tend to indicate that the qualified correspondents' data would be about equal to the ½ point corrected subjective evaluations.

All the evidence so far would have tended to support the need for the ½ point correction to subjective evaluations, but no more. The justification for an additional 20% comes from other sources.

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1. Source: Computed from M.Yurtsovskii, SO., 1929, no.5, p.119. Note these figures do not refer to all the qualified correspondents in all the areas cited, but just to those areas which were also covered by control measures.

Budget studies data

Budget studies were used to provide control materials on yield and sown area as well as to provide basic materials on utilisation and other matters[1]. From 1923 there was already a very wide coverage of these studies[2]. These investigations were carefully carried out by experienced statisticians from GSB and the results were checked for consistency with the utilisation balance for the same households. It was therefore argued that the data from this source were more reliable than that from other sources. But as we shall see below there were some grounds to question the typicality of the selected households and the internal reliability of their data.

A comparison of the results of these early budget studies with the results of the autumn survey corrected with the 0.5 point is given below:

Yield for all grains	1923	1924
Budget data	7.28	5.90
autumn investigation including 0.5 point correction	7.16	5.60
additional correction needed	+1.7%	+5.4%

Source: V.M.Obukhov, in Byulleten TsSU, 1926, no.118, April 1926

If we accept the argument that the budget studies data are typical and reliable, we see that they completely justified the existence of the 0.5 point correction and indicated that a small additional correction was required.

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1. See the appendix for a general account of the nature of budget statistics. (pApp. 305-9)
2. There were over 8,000 budget studies in 1923/24 and over 10,000 annually from 1924/25 (see p.App307, below). For comparison we should note that the pre-revolutionary Ministry of Agriculture correspondents network only covered 8,500 correspondents at its pre-war peak in1913.

For 1925 and 1926 the quantity of data available is quite large reaching 9,989 processed studies in 1925 and 9,475 in 1926[1]. And these data appear to indicate the need for a much greater correction as can be seen from the following comparisons:

	1925 (in tsentners per hectare)			1926		
	Budget data	Local subj.	Budget / Local subj.	Budget data	Local subj.	Budget / Local subj.
1.NCR						
RSFSR	8.34	6.97	119.7%	8.82	7.33	120.3%
BSSR	7.83	6.90	113.5%	6.88	5.53	124.4%
2.SCR						
3.SPR						
UkSSR	9.30	8.70	106.9%	8.58	6.72	127.7%
	9.60	-	-	5.71	4.75	120.2%
4.CPR	7.27	5.67	128.2%	8.50	7.53	112.9%
5.EPR						
Sib kr.	8.40	6.61	127.1%	8.61	7.24	118.9%

Source: Computed from Urozhai khlebov i trav v 1925 i 1926 gg., M.1929 pp.XI, XII.

In most cases a correction of up to 20% appears to be recommended with the notable exception of the UkSSR in 1925 where only a 7% correction seems required. This magnitude of corrections appears to be directly analogous to that applied to the post 1923 TsSU yield data (see above).

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1. See Urozhai khlebov i trav v 1925 i 1926 gg., M.1929, p. IX

Control measurements of reaping and threshing

As was noted above[1], the practice of making experimental control threshings (probnyé moloty.) dates back deep into antiquity and appears to have been fairly widely used by estate officials, agents of the local administration and zemstvo statisticians in the nineteenth century. The procedure was presumably carried on at the discretion of local statisiticans in the different localities in order that their subjective evaluations would be better informed. But since it was not originally on the TsSU work plan and neither time nor money were set aside for it or instructions given as to how it should be carried out, it was probably little used until the late 1920s.

In 1926 the local correspondents were instructed not only to make their preliminary subjective evaluations of the yield but also to carry out some control measurements of reaping and threshing of the 3-4 main grains on 3 households. The households were to be well known to the correspondents but the names of these households were not to be included on the form. It was hoped that the offer of anonymity would remove the inclination to conceal the real level of yield. The procedure was apparently to count the number of reaping units (i.e. sheaves) per sown area and to measure the weight of grain threshed per reaping unit. Dubenetsky in his account of these procedures specifically drew attention to the fact that these were to be carried out as separate operations and that it was not necessary to measure the weight of all those sheaves that had been counted and that it was possible to measure the weight of grain threshed from other sheaves[2]. These data would obviously be collected

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1. See pp 3-4
2. See Urozhai khlebov i trav v 1925 i 1926gg., M.1929, p.IX.

at the time of the harvest and so would be available a little later than the last preliminary harvest evaluation made at the time of the first threshings, but well before the budget study results.

Since each correspondent was instructed to carry out three such measurements, there should have been data covering 80,000 - 100,000 households, but in fact only the data for 30,000 households were received. This is not really surprising considering that virtually all the correspondents had their own households to consider and that they would have found it extremely difficult to get away at the most busy time of the year to make these measurements.

The results of these control measurements made by the local correspondents were not very satisfactory. Although they did indicate a level higher than the local subjective evaluations in most areas, in those areas where the subjective evaluations indicated a particularly low yield, the local reapings and threshings data indicated an even lower level, as can be seen from the table below:

in tsentners per hectare

	Winter Rye			Oats			Others		
	local correspondents			local correspondents			local correspondents		
1926	subjective	reapings & thrashings	%	subjective	reapings & thrashings	%	subjective	reapings & thrashings	%
1. NCR Consuming Regions	7.33	7.41	101.0	8.53	8.79	103.0	7.54	7.42	98.4
BSSR	5.53	5.13	92.8	5.50	5.62	102.2	5.47	5.56	101.6
3. SPR									
UkSSR	6.72	7.74	115.2	6.61	7.21	109.1	6.34	7.03	110.9
Sev Kavkaz	4.75	4.09	86.1	8.43	-	-	6.75	7.06	104.6
4. CPR Producing Regions	7.53	7.89	104.8	8.25	9.06	109.8	6.84	7.23	105.7
5. EPR Sibirskii Krai	7.26	7.33	101.2	7.60	8.56	112.6	6.99	6.85	98.0

Source: from Urozhai khlebov i trav v 1925 i 1926gg., M.1929, p.XI

Apart from this attempt to get the correspondents to carry out control measurements of reapings and threshings, there was at least one example of a local statistical office attempting on its own initiative to carry out a similar investigation in the mid 1920s. This was the Urals statistical office, which later reported that it had been using such control measurements from at least 1926[1]. Nemchinov was in charge of this office until he was transferred to Moscow and to the collegium of TsSU in September 1926[2]. And these series of measurements were probably begun by him. A. Kustarnyi appears to have been the new director of the Urals statistical office, and it was he who reported on the Urals experiments. Neither Nemchinov nor Kustarnyi however refer to Nemchinov's involvement in this work.

The Urals trial threshings were made on 3,822 plots in 1926 and on 10,663 in 1927. They were not accompanied by control measurements of the area reaped and so were liable to criticism for accepting unchecked sown area data. The results of these measures when checked against the autumn survey and voluntary correspondents' results were as follows:

	Yield in tsentners per hectare from		
Urals Oblast 1926	autumn survey	voluntary correspondents	trial threshings
Spring Wheat	6.60	7.20	7.35
Oats	8.70	10.80	10.11
Barley	5.10	7.80	6.17

Source: A.Kustarnyi, SO , 1929, no.5, p.121.

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1. See report by A.Kustarnyi, in Uchet urozhaya na molotilkakh obshchestvennogo polzovaniya, in SO, 1929, no.5, pp.120-21.
2. See Nemchinov's obituary in VS, 1964, no.12, p.76 and SZ, 1926, 25-167.

In 1928, at the Conference of Agricultural Sectors of TsSU, under Nemchinov's chairmanship, it was decided that experimental control measures of reaping and threshing should be carried out on a wide scale in 12 separate regions[1].

It was explained that reliance on budget study results was unsatisfactory because the results only became available 2 years after the harvest, which was totally unsatisfactory for any operational control. Control measurements of reapings and threshings on the other hand would be immediately available even before the completion of harvesting. The method was quite simple. The number of sheaves of grain reaped from a measured area would be noted. And the weight of grain threshed from about half of these sheaves would be noted. Each measured area was to be not less than 2,700 square metres (0.27 hectares) and no more than 2.2 hectares, and there were to be at least 100 areas per uezd and 150 per okrug for each grain. The villages where the controls were to be applied were chosen randomly by the method of diagonals and within the villages the fields to be surveyed were chosen so as to be typical of the given locality.

In his article on the organisation of the measurements Yurtsovsky was quite emphatic that the control threshings had to be carried out in the normal conditions for the given area. He also pointed out that 'the yield on the stalk before the harvest without any natural shedding, the yield gathered in sheaves before transporting and the yield after threashing were logically different categories and that 'the mixing up of these categories leads to the application of incorrect coefficients[2]. Altogether control

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1. See M.Yurtsovsky 'Opredeleniye urozhaya po kontrolnyim nazhenam i obmolotam v 1928g., in SO. 1928, no.7, pp.105-06 for a description of the organisation of these control measurements, M.Yurtsovsky, 'Rezultaty proizvodstva kontrolnyikh nazhinov i obmolotov v 1928 g.', in SO, 1929, no.5, pp.117-20 for the preliminary results.

2. M.Yurtsovsky, SO, 1928, no.7, p.106.

measurements were made in 1928 in about 71,000 fields in about 1,400 different villages.

The results of these investigations when compared with the results from other sources are given below: see over page.

In 1929 the scale of control harvest measurements was more than doubled covering 25,192 hectares as opposed to 12,330 hectares in 1928. The average size of measured plot was increased from 0.56 hectares to 0.64 hectares, and so there was slightly less than a doubling in the number of plots measured i.e. from 21,372 plots in 1928 to 39,108 plots in 1929. Again, almost two-thirds of these measurements were in the Ukraine[1].

More than double the amount of money was budgeted for this work i.e. 45,000 roubles instead of 18,900 roubles in 1928 and so there might well have been improvements in the care and time allowed for these measurements. The slight organisational changes which were made in the selection of plots and in the carrying out of these measurements are explained by Yurtsovsky[2]. One of the main changes was the abandonment of the attempt to select typical plots in the different villages and the decision to make a random selection.

In comparing the results of these control measurements with the results from other sources the statisticians apparently excluded some of the control measurements results as described below:

> All okrugs were excluded in which the control reapings and threshings gave results lower than those given by direct indications from forms and local control estimation.

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1. For details of the organisation and the results of the 1929 control measurements see M.Yurtsovsky, Predvaritelnyi itogi kontrolnyich nazhinov i oblomotov v 1929g., in SO, 1930, no.3/4, pp.96-103.
2. See M.Yurtsovsky, SO , 1930, no.3/4, pp.46-99.

	Number of measured	from control measures	Local correspondent		autumn survey	Qualified correspondent		
			own household	6 neighbours households		own household	6 neighbours households	
1. NCR								
Tsent. Prom	1453	11.57	11.51	10.25	8.54	10.37	9.52	Rye and Oats
Zapadnyi	203	9.35	8.93	-	7.55	8.50	7.64	Rye
3. SPR								
UkSSR	14183	8.09	7.43	7.39	6.52	7.69	7.37	Rye, Wi.Sp.Wheat, Barley, Oats, Buc Wheat, Millet
4. CPR								
Tsent.Chernozem	1608	7.51	7.36	6.88	5.72	6.52	6.23	Rye and Oats
Nizhne Volzhsk krai	817	7.22	6.35	6.49	5.75	6.35	6.19	Rye, Sp.Wheat, Oa
Sredne Volzhsk krai	798	8.66	-	-	-	7.31	7.16	Rye, Sp.Wheat, Oa
Bashkir ASSR	1084	8.20	7.57	7.78	7.28	7.84	7.57	Rye, Sp. Wheat, O
Vyatskii	616	9.32	6.95	7.49	8.30	8.33	7.78	Rye, Oats
5. EPR								
Urals obl.	868	9.85	9.26	8.78	8.38	9.41	8.53	Rye, Sp.Wheat,Oat:
Sibirskii krai	742	8.77	-	-	6.02	8.12	7.73	Sp.Wheat, Oats

Cont'd...

Source M. Yurtsovskyi, SO, 1929, No. 5, p. 119.

1928	Control	% Relationship to control measurements: local correspondent, own household	local correspondent, 6 other households	autumn survey	qualified correspondent, own household	qualified correspondent, 6 other households	Grains covered
1. NCR							
Tsent. Prom	0	+ 0.5	+12.9	+35.4	+11.6	+21.6	Rye & Oats
Zapadnyi	0	+ 4.7	-	+23.8%	+10.1%	+27.4%	Rye
3. SPR							
UkSSR	0	+ 8.9%	+ 9.5%	+24.1%	+ 5.3%	+ 9.8%	Rye, Wi.Sp. Wheat, Barley, Oats, Buckwheat Millet
4. CPR							
Tsent. Chernozem	0	+ 2.0%	+ 9.2%	+31.7%	+15.7%	+20.4%	Rye & Oats
Nizhne Volzhsk. krai	0	+15.7%	+11.3	+75.5	+13.7	+16.7%	Rye, Sp. Wheat, Oats
Sredne Volzhsk, Krai	0	-	-	-	+18.4	+20.9%	Rye, Sp. Wheat, Oats
Bashkir ASSR	0	+ 8.3	+ 5.4	+12.6	+ 6.6	+ 8.3	Rye, Sp. Wheat, Oats
Vyatskii	0	+34.1	+24.4	+12.3	+11.9	+19.8	Rye & Oats
5. EPR							
Urals obls.	0	+ 6.3	+12.1	+17.5	+ 4.6	+15.5	Rye, Sp. Wheat, Oats
Sibirskii krai	0	-	-	+45.5%	+ 7.9%	+13.4%	Sp. Wheat & Oats

Source M. Yartsovskyi, SO, 1929, No. 5, p. 119.

These exclusions were carried out on the basis of the supposition that the control reapings in these cases had been carried out unsatisfactorily and were therefore defective. This supposition was based upon the experience of all the work of TsSU (USSR) in the field of comparing mass statistical data with corresponding control materials; there were no cases when mass statistical data had exceeded the real size of the basic elements of agricultural production.

Apart from that, last year's experience had shown that those localities where control reapings and threshings had given results lower than the statistical sources were all carrying out this work unsatisfactorily[1].

In 1929 measurements were carried out in 90 separate okrugs. Of these Yurtsovsky lists 17 where the results were excluded.

Separate figures were given for the resulting yields with the inclusion of 'ozadki' and without 'ozadki'. Ozadki were the partial grain splinters, dust and other non whole grain matter left after threshing. These items were normally excluded from harvest reports as Yurtsovsky readily admits[2]. It is claimed that they cannot be ignored as they play an important role in the grain forage balance as a supplement to livestock feed. Therefore, TsSU apparently applied corrections to the yield data 'not only for underestimates but also for the collection of ozadki [3]. The relative importance of ozadki to whole grain in the yield evaluations varied considerably from 3-14% as can be seen from the following table:

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1. M.Yurtsovsky, S.O., 1930, no.3/4, p.100.
2. M.Yurtsovsky, S.O., 1930, no.3/4, p.100.
3. M.Yurtsovsky, S.O. 1930, no.3/4 p.101.

		% ozadki to wholegrain
1. NCR	Moskovskaya ob.	5.3%
	Ivanovskaya Prom.ob.	3.1%
	Nizhegorodskaya ob.	3.2%
	Zapadnaya ob.	11.1%
2. SPR	UkSSR	7.2%
	Severo Kavkaz krai	11.4%
3. CPR	Tsent Chernozem ob.	5.4%
	Nizhne Volzhskii krai	5.5%
	Sredne Volzhskii krai	14.1%
5. EPR	Uralskaya ob.	9.3%
	Sibirskii krai	8.0%

Source: Calculated from M.Yurtsovsky, S.O. 1930, no.3/4, p.101.

After comparing the final Expert Soviet adjusted qualified correspondents' data with the results of the control measures of reaping and threshings (see table over page) Yurtsovsky noted that the control measures gave higher results in all areas apart from North Caucasus and Sibirskii Krai. Yurtsovsky claimed that since this was the first year that control measurements had been made in the North Caucasus it was quite likely that they had not carried them out correctly. He was however inclined to accept the Siberian control measurements and claimed that the budget data here appeared to be a little high[1].

The results for separate grains were less satisfactory. Apparently it was found that oats tended to be more under-estimated than other grains. As Yurtsovsky pointed out this was somewhat different to what was expected (peasant underestimation of food grains always having been expected to be more significant). But it was probably explained by the fact that oats were harvested late and that only preliminary evaluations were available.

1. See M.Yurtsovsky, S.O., 1930, no.3/4, p.102.

1929	Yields for all localities: Control reapings and threshings with ozadki	Yields for all localities: Control reapings and threshings without ozadki	Yields for all localities: qualified correspondents data corrected	Yields for all localities: control reapings & threshings qualified correspondents	Yield for localities excluding defective okrug data: Control reapings and threshings with ozadki	Yield for localities excluding defective okrug data: Control reapings and threshings without ozadki	Yield for localities excluding defective okrug data: qualified correspondents data corrected	Yield for localities excluding defective okrug data: Control reapings & threshings % to qualified correspondents' with ozadki	Yield for localities excluding defective okrug data: Control reapings & threshings % to qualified correspondents' without ozadki	Yield for localities excluding defective okrug data: TsSU correction to Qualified correspondent data
1. NCR										
Moskovskaya Ob.	10.13	9.62	8.55	118.5%	10.13	9.62	8.55	118.5%	112.5%	104.5%
Ivanovskaya Prom. Ob.	10.13	9.83	9.07	111.7%	10.13	9.83	9.07	111.7%	108.4%	104.0%
Zapadnaya Ob.	11.55	10.41	9.50	121.6%	11.55	10.41	9.50	121.6%	109.6%	108.1%
Nizhegorodskaya Ob.	9.86	9.55	7.26	135.8%	9.86	9.55	7.26	135.8%	131.5%	-
3. SPR										
UkSSR	8.92	8.34	8.14	109.6%	9.82	9.16	8.49	115.7%	107.9%	111.2%
Severo Kavkaz krai	5.16	4.71	5.04	102.4%	6.26	5.62	5.66	110.6%	99.3%	112.3%
4. CPR										
Tsent Chernozem Ob.	9.21	8.76	7.80	118.1%	9.54	9.05	7.77	122.8%	116.5%	111.4%
Nizhne Volzhskii krai	7.48	7.09	5.42	138.0%	7.48	7.09	5.42	138.0%	130.8%	131.3%
Sredne Vol.krai	3.48	3.05	3.25	107.1%	3.48	3.05	3.25	107.1%	93.8%	128.9%
Tatarsk ASSR	5.15	4.94	4.53	113.7%	-	-	-	-	-	-
5. EPR										
Uralskaya Ob.	6.79	6.21	5.01	135.5%	6.49	5.94	5.01	129.6%	118.6%	125.8%
Sibirskii krai	5.96	5.48	4.85	122.9%	6.05	5.60	4.53	133.6%	123.6%	138.7%

Source: M.Yurtsovsky, S.O., 1930, no.3/4, p.101.

Yurtsovsky looked forward to 1930 being the year when control measurements would be transformed from being carried out on a merely experimental basis, to being carried out in all regions and to becoming 'a practical control for mass statistical data'. He did however predict increased problems as the class warfare in the countryside increased. The report given by Minusinskii okrstatotdel in Sibirskii krai gives an indication of the problems the control measures were faced with in 1929:

> The conditions of work were extremely bad. The peasants at all the threshings tried to deceive our workers. Having threshed the grain the peasants refused to winnow it on the same day although there was plenty of time. At night they attempted to hide part of the threshed grain in order to lower the yield.
>
> Therefore our workers had to guard the threshed grain throughout the night - otherwise we would have get very bad results. In general the attitude of the peasants to the threshings was very hostile, and the village organs often failed to help' [1]

An alternative view was again expressed by the Urals statistician A.Kustarnyi in the TsSU (RSFSR) journal[2]. Kustarnyi argued that it would be a mistake to carry out control threshings on a mass scale because that would lower the quality of the work and it might very well produce different results. He cited the evidence of 5 grains in Tyumenskii Okrug in which in 1929 trial threshings had been carried out by the agents of the rural soviet as well as by statisticians of the okrstat department. The results are given in the table below:

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1. M.Yurtsovsky SO 1930, No.3/4, p.99.
2. A.Kustarnyi S.i NK 1930, no.5.

Urals Oblast Raion	Number of trial threshings: okrstat-otdel Wheat	okrstat-otdel Oats	Rural Soviet Wheat	Rural Soviet Oats	Yield in tsentners/hectare: Wheat okrstat-otdel	Wheat Rural Soviet	Wheat okrstat-otdel as % of Rural Soviet	Oats okrstat-otdel	Oats Rural Soviet	Oats okrstat-otdel as % of Rural Soviet
Isetskii	10	10	12	12	9.4	6.9	136.2%	5.2	4.1	126.8%
Inichinskii	10	10	8	8	12.1	8.6	140.7%	12.6	8.9	141.6%
Tyumenskii	26	26	11	9	8.5	5.9	144.1%	8.8	6.2	141.9%
Patrovskii	20	20	29	22	10.9	9.2	118.5%	6.0	5.8	103.4%
Suerskii	10	10	5	3	9.5	6.8	139.7%	6.9	6.0	115.0%

Source: A.Kustarnyi, S.i N.K., 1930, no.5, p.125.

Kustarnyi noted that the control threshings carried out by the local soviet agents were in all cases lower than those of the okrstatotdel statisiticans and quite substantially so in some cases. He argued that the control measurements were only of use when carried out extremely carefully 'like any form of laboratory work' and that turning it into a mass operation using local agents would only destroy its value.

Kustarnyi then went on to describe how the Urals control threshings carried by the different okrstat departments provided results which totally confirmed the grain forage balance results for September 1.[1] However, he then immediately qualifies this by stating that the trial threshings did include 'ozadki' as well as grain, and that 'ozadki' as accepted by the controllers included not only defective grain but also non-grain additives and seeds from weeds and grasses. Some correction was therefore needed for the non-grain element within 'ozadki'[2].

1. A.Kustarnyi, S.i N.K., 1930, no.5, p.125.
2. A.Kustarnyi, S.i N.K., 1930, no.5, p.141.

d) Yield data 1924-1929

As noted above the yield data for 1923, 1924 and 1925 which were published in 1925 and 1926 were based on preliminary subjective evaluations corrected with a ½ point correction and also with an additional 20%. For later years the yield data were based on a variety of sources using a variety of different methodologies. The results appear to have been roughly comparable with the above cited 1923, 1924 and 1925 data, although there do appear to have been quite significant year to year fluctuations. The reason for these fluctuations appears to be mainly political.

At the beginning of 1927, N.I.Dubenetsky in his first major report after the formation of the 'Expert Soviet', presented the new evaluations of the 1925 and 1926 yields and described the methodology by which they had been calculated[1]. Both the 1925 and the 1926 yield evaluations made at this time had used different methodologies for different areas. For the 1925 harvest, for 48% of the sown area covering the Consumer Regions, UkSSR and the Central Chernozem Region yield was calculated according to the data collected from the qualified correspondents network, but with the inclusion of a correction based on an analysis of the production and utilisation parts of a grain forage balance. For the remaining 52% of the country the yield was still evaluated according to the results of the preliminary subjective evaluation corrected with the 0.5 point correction. Overall Dubenetsky informs us the above data gave a yield figure of 7.60 tsentners per hectare, which rose to 8.12 ts/hectare with the addition of a 7% correction as indicated by the utilisation balances[2].

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1. See N.I.Dubenetsky, SO., 1927, no.1, pp 20-31 In this article Dubenetsky makes several statements about the relative reliability of different sources of data (specifically grain utilisation balance data of more conventional yield data) which directly contradict statements which he had earlier made. But as already mentioned above on this and all subsequent occasions he was speaking as the spokesman for the TsSU Expert Soviet, whereas earlier he was speaking as head of a department over which he had control.
2. See N.I.Dubenetsky, SO., 1927, no.1, p 25 The 7% correction refers to the level of correction applied to the yield for all the USSR.

For 1926, for RSFSR and BSSR yield was calculated according to the first harvest results from the 8,000 qualified correspondents within these two republics. These yield data were then corrected by applying a correction coefficient to account for the difference between the evaluation of first harvest results (at time of first threshings) and the final harvest results as recorded in the 1925/26 grain forage balance. This provided a correction coefficient of 8%. For the UkSSR the yield evaluation was based on subjective evaluations made at the time of the harvest presumably by the normal correspondents network, and this was checked against a special investigation made by TsSU (UkSSR). For ZSFSR and the Central Asian Republics the yield was also calculated according to subjective evaluations made at the time of harvest, but here no mention was made of correction coefficients[1].

yield in tsentners per hectare

Year	Winter Rye	Spring Rye	Winter Wheat	Spring Wheat	Barley	Oats	Buckwheat	Millet	Maize	Secondary grains	All
1925	7.42	7.05	9.23	7.44	9.11	8.29	6.21	7.42	14.60	8.81	8.12
1926	8.27	7.73	8.77	7.50	7.75	9.11	5.76	5.83	13.01	9.07	8.18

Source: N.I.Dubenetsky, SO., 1927, no.1, p.28

Two 1927/1828 sources of the calculation of the 1927 and earlier yields are available. The explanatory notes to the official grain forage balance for 1927/28 as compiled by the Expert Soviet with an introduction by P.Kerzhentsev[2], and the account given by N.I.Dubenetsky in the TsSU journal[3]. The figures given in these sources correspond to those in the grain trade handbook for this year[4].

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1. See N.I.Dubenestky, SO., 1927, no.1, p.26.
2. Predpolozhitelnyi khlebo-furazhnyi balans na 1927/28g., M.1927
3. N.Dubenetsky, 'Produktsiya zernovykh kultur SSSR v 1927 godu, SO., 1928, no.2, pp.16-25.
4. Ezhegodnik po khlebnoi torgovly, No.1, M.1928. pp.83-85

Dubenetsky states that the yield for 1924 was established by using budget investigations while that for 1925 used also the autumn investigation[1]. He explained that the autumn investigation, covering 2-3% of all households, gave the best reflection of the geographical variations in the yield, but that its level was low and that the data from the budget investigations gave a more precise indicator of the overall level of yield when applied to fairly large areas[2]. The yield results together with the sown area evaluations were then apparently checked against the utilisation balances.

For the 1926 evaluation, TsSU wanted again to use the autumn investigations and the budget studies, but there was an unusually long delay in the processing of the budget data. The delay was caused by the carrying out of the 1926 demographic census. The 1926 budget data only became available in the summer of 1927 and TsSU was therefore forced to rely on the data from the qualified correspondents' network[3]. The data from the qualified correspondents' network was then corrected by applying a coefficient that covered the difference between the 1925 budget data results and the 1925 qualified correspondents' data. The magnitude of these coefficients were overall +9% for the final harvest evaluation and +14% for the evaluation made at the time of first threshings.

For the 1927 preliminary evaluation made at this time only the preliminary pre-harvest data of the qualified correspondents network were available. These data were corrected overall by 13%. The correction coefficients were set according to a scale worked out by Obukhov's Institute of Experimental Statistics (no doubt similar to the earlier Yastremsky scales).

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1. N.Dubenetsky, SO , 1928, no.2, p.17.
2. It was considered necessary to have a significant number of budget studies in an area, before it could be ascertained how typical the covered households were and what the average would therefore be. The dynamic censuses were significant here as explained above, p p356-7
3. Predpolozhitelnyi khlebo-furazhnyi balans na 1927/28g., M.1927, p.46.

All the proposed levels were accepted by the Expert Soviet with the exception of the North Caucasus where the yield evaluation was lowered by 6.8% from 7.08 ts/ha to 6.60 ts./ha[1]. The Expert Soviet acknowledged that some further adjustment might be required when the final post-harvest data and budget studies data were available, but nevertheless they expected that this would not change the level by more than 1.7%.[2]

The all union grain yield figures for the different main types of grain which were given in this source were as follows:

in tsentners per hectare

	Winter Rye	Spring Rye	Winter Wheat	Spring Wheat	Barley	Oats	Buck wheat	Millet	Maize	All main grains	Secondary	All grain
1905-14	7.36	6.78	8.32	6.70	8.18	7.68	5.49	6.75	11.21	7.46		
1924	6.73	6.45	7.50	5.37	5.37	6.58	5.16	4.10	9.67	6.29	6.66	6.30
1925	7.86	6.80	9.34	7.68	9.56	9.11	5.79	7.45	13.38	8.39	8.20	8.39
1926	8.13	7.76	8.54	7.43	7.48	9.43	6.68	6.23	12.34	8.16	9.12	8.19
1927	8.72	9.13	7.86	5.96	6.61	7.50	7.03	8.66	13.10	7.73	8.70	7.75

Sources: 1905-14, 1924-27. All main grains from N.I.Dubenetsky, SO, 1928, no.2, p.22. 1924-27 All main grains, secondary and all grains from Ezhegodnik khlebnoi torgovly no.1, M.1928, p.84

Note: Although these two sources give identical figures for all main grains yields and for most of the yields for the separate grains, there are a few odd discrepancies e.g. the latter source gives 6.85 ts./ha. for 1924 oats yield, instead of 6.58 ts./ha., 6.62 ts./ha. for 1926 millet yield instead of 7.86 ts./ha.

The regional distribution of yields for all grains from these sources was the following:

	NCR	SCR	SPR	CPR	EPR	USSR
1924	7.7	9.1	6.0	4.8	7.2	6.3
1925	8.1	9.4	9.8	6.9	8.4	8.4
1926	8.1	9.6	7.9	8.0	8.8	8.2
1927	8.2	8.7	8.0	7.6	7.5	7.8

Source: Ezhegodnik khlebnoi torgovly no.1, M.1928, p.84

1. Predpolozhitelnyi khlebo furazhnyi balans na 1927/28g., M.1927, p.46.
2. Predpolozhitelnyi khlebo furazhnyi balans na 1927/28g., M.1927, p.47 and N.Dubenetsky, SO, 1928, no.2, p.18.

The only available 1928/29 detailed source of the calculation of the 1928 and earlier yields was again the explanatory notes to the official grain forage balance for 1928/29. This was an official Expert Soviet publication with an introduction by L.Kritsman[1]. No equivalent account ever appeared in the TsSU journals.

This source states that overall a 12.1% correction was applied to the data of the qualified correspondents collected at the time of first threshing of the harvest. The source states that a different method was used in ZSFSR and Central Asia, but no explanation is given as to how the yield was provisionally evaluated there.

The data given in this source appears to be the same as the more detailed data given in the 1929 statistical handbook[2]. This source provides the following figures for the main types of grain.

in tsentners per hectare

	Winter Rye	Spring Rye	Winter Wheat	Spring Wheat	Barley	Oats	Buck-Wheat	Millet	Maize	All main grains	Secondary	All grains
1925	7.9	7.6	9.3	7.9	9.2	9.0	5.7	7.4	13.2		7.8	8.3
1926	8.3	7.9	9.7	7.7	7.4	9.7	5.1	4.2	11.5		6.9	8.2
1927	8.6	8.2	8.1	5.8	6.5	7.2	6.5	8.5	12.7		7.3	7.5
1928	7.5	7.9	6.7	8.0	7.7	9.3	5.7	5.1	7.6		8.9	7.7

Source: Statisticheskii spravochnik SSSR, 1928, M.1929, pp.180-96.

The regional distribution of all grains from these sources was as follows:

in tsentners per hectare

	NCR	SCR	SPR	CPR	EPR	USSR
1925	8.1	9.3	9.6	6.9	8.5	8.3
1926	8.0	9.0	8.0	7.9	9.0	8.2
1927	7.8	7.9	8.1	7.0	7.2	7.5
1928	7.8	9.4	6.6	7.5	9.4	7.7

Source: See Statisticheskii Spravochnik SSSR,1928, M.1929, pp.180-96

1. Osnovniye elementi i produktsiya sel khoz SSSR za 1925/26-1928/29gg s prilozheniyem predpolozhitelnogo khlebo furazhnogo balansana 1928/29g M.1928

2. Statisticheskii spravochnik SSSR 1928, M.1929, pp.180-96

We know that there was a serious conflict in the Expert Soviet in the autumn of 1929 and that the statisticians were accused of failing to provide a sufficiently favourable indication of the harvest prospects[1]. This was partly, no doubt, concerned with the statisticians' reluctance to increase the scale of corrections being applied to grain sown area data, but it possibly also covered the yield evaluation.

The final evaluation of the yield claimed that it was 6% less than the previous harvest. This was the lowest yield for the last five years but it meant that there had been a remarkably lengthy period without any substantial harvest fluctuations. This is somewhat suspicious. And it is highly conceivable that the real level was much lower, that lower indications of yield were being sent to the statisticians in the Expert Soviet and that the latter were showing reluctance to adjust these evaluations also.

After the conflict with the Expert Soviet in the autumn of 1929, the decision was made to abolish the qualified correspondents' network and to severely limit the budget studies investigations. It was therefore necessary to change the basic method of applying corrections to the basic yield data. In these circumstances the new Expert Soviet appears[2] to have favoured the use of the basic autumn investigations data with the application of a fairly substantial central correction as well as supplementary regional corrections. By 1929 the autumn survey was being carried out almost exclusively by the local (non-qualified) correspondents' network. These local correspondents dealt directly with the local statistical and administrative agencies and were therefore more open to local pressures. In the autumn of 1929 local pressures were extremely intense.

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1. See above p.312 and S.G.Wheatcroft, ibid., Birmingham 1974, pp.166-9
2. The following account is based on the extracts of the materials of the working commission of the Expert Soviet of TsSU (USSR), which were published in M.Yurtsovsky's article in SO., 1930, no.3/4, pp.101-04. These materials have not been published and Yurtsovsky gave no indication of the date when the commission was sitting.

Yurtsovsky informs us that the level of central correction was to be set according to the following scale:

direct data on yield in ts./ha.	1.65	3.30	4.95	6.60	8.25	9.90	11.55
correction coefficient	38.3%	28.3%	20.9%	13.5%	8.3%	5.6%	4.3%

Source: M.Yurtsovsky, SO, 1930, no.3/4, pp.101-2.

The scale was worked out by Obukhov's Institute of Experimental Statistics within TsSU and appears to be an aggregation of Yastremsky's six regional scales. These correction coefficients were applied to the uncorrected mass data of the autumn investigation for the period 1925-27 and were compared with the earlier corrected data (based primarily on budget studies data). These comparisons allowed the order of the supplementary regional corrections to be established. The following table provides an indication of the magnitudes involved:

in tsentners per hectare

Region	Initial uncorrected evaluation	Correction according to: a)Budget data	b)Expert Soviet scales	Local correct (a-b)
NCR				
Moskovsk Ob.	8.55	4.5%	8.6%	-4.1%
Ivan Prom.Ob.	9.07	4.0%	7.0%	-3.0%
Zapadnaya Ob.	9.50	8.1%	6.3%	+1.7%
Nizhegorod.Krai	7.26	-	11.6%	-
SPR				
UkSSR	8.49	11.2%	8.2%	+3.0%
Sev.Kav.Krai	5.66	12.3%	17.5%	-5.2%
CPR				
Tsent.Ch.zem Ob.	7.77	11.4%	10.0%	+1.4%
N.Volzhskii Krai	5.42	31.3%	18.5%	+12.8%
Sred Volzhskii K.	3.25	28.9%	26.0%	+2.9%
EPR				
Uralskaya Ob.	5.01	25.8%	20.5%	+5.3%
Sibir Krai	4.53	38.2%	22.3%	+15.9%

Source: calculated from data in M.Yurtsovsky, SO, 1930, no.3/4 p.101.

The central correction coefficients were then applied to the 1927, 1928 and 1929 uncorrected mass data from the autumn investigations and later local supplementary corrections were then applied[1]. Unfortunately Yurtsovsky failed to provide an indication of the scale of local corrections in either 1928 or in 1929.

The yields as given in the early 1930s for all the main grains for all the areas of the USSR are given below: *in tsentners per hectare*

Year	Winter Rye	Spring Rye	Winter Wheat	Spring Wheat	Barley	Oats	Buckwheat	Millet	Maize	All main gr.	Secondary	All grains
1925	8.43	7.55	9.93	7.85	9.23	8.97	5.71	7.37	13.24			8.58
1926	8.83	7.89	9.95	7.69	7.41	9.70	5.07	4.19	11.53			8.36
1927	8.87	8.17	8.72	5.90	6.48	7.33	5.19	7.89	11.29			7.62
1928	7.76	7.72	7.80	7.96	7.77	9.51	5.56	5.26	7.40		8.45	7.93
1929	8.17	8.02	7.91	5.91	8.92	8.34	5.37	5.55	8.52		7.02	7.47

Source: Sdvigi v sel.khoz.,M.1932, p.154
Nar.Khoz SSSR, M.1932, p.164 for secondary grains 1928 and 1929

Note: These figures are for grain yield in all sectors.

The regional distribution of all grains from these sources are given as follows:

in tsentners per hectare

	NCR	SCR	SPR	CPR	EPR	USSR
1928	8.4	9.4	7.0	7.7	9.2	8.0
1929	8.6	8.6	8.4	6.7	6.0	7.5

Source: See Nar.Khoz.SSSR,M.1932,p.164

Subsequent statistical handbooks have reproduced these figures[2].

Again for the period of the late 1920s we are confronted with a set of partial series of data, covering only a few years, nonearlier than 1924. The position is in fact worse than for grain sown area since there have been no publications of the basic uncorrected yield data at all comparable with

1. See M.Yurtsovsky, SO , 1930, no.3/4, pp.101-02.
2. See Sotg.stroi.SSSR, M.1934, 1935 and 1936

the Gayster publication of uncorrected sown area data.

In the concluding section to this chapter I will again present an attempt to construct a comparable series of data spanning the pre-war years and the period from 1920-1929. But again we will first briefly consider the available non-peasant grain yield data.

e) Non peasant grain yield and production data

The sources of data for the grain yields in the non-peasant sectors of production were the taxation returns for the early 1920s and the censuses of kolkhoz and sovkhoz production for later years. These have already been described above in the chapter on sown area[1]. In many cases the only way that the yield figures can be ascertained is by calculating them from the more readily available data on sown area and production. I have therefore also included a discussion of the data on grain production by the non-peasant sector in this section.

Data supplied by Dubenetsky in 1927 on grain production and sown area by sector of production allow us to calculate the yields in the different sectors in 1925 and 1926.

		Individual Peasants	SF & CF	Urban	All
1925	Production	69.60	1.47	0.49	71.56
	Sown area	85.69	1.53	0.49	87.66
	Yield	8.12	9.61	10.00	8.16
1926	Production	74.33	1.49	0.48	76.30
	Sown area	90.83	1.53	0.49	92.80
	Yield	8.18	9.74	9.80	8.22

Source: N.I.Dubenetsky, SO., 1927, no.1, pp.25,26.

The yields in the Sovkhoz (SF) and Kolkhoz (CF) sector were registered as being 18-19% higher than the individual peasants sector and the yields on the urban allotments were even slightly higher.

Data comparable with a later Expert Soviet evaluation allow the sectoral data to be extended back to 1924.

1. See above p.387.

	Production in mln Cons			Yield in cs./hq.			Non Peasant/All	
	Peasant	Non Peasant	All	Peasant	Non Peasant	All	Prodn.	Yield
1924	51.57	1.48	53.05	6.3	7.1	6.3	2.8%	+12.7%
1925	77.43	2.08	74.51	8.4	9.9	8.4	2.8%	17.9
1926	76.28	2.02	78.30	8.2	9.2	8.2	2.8%	+12.2%
1927	74.13	1.94	76.07	7.8	9.2	7.8	2.6%	+17.9%

Source: Computed from N.Dubenetsky, SO, 1928, no.2, p.23 and Ezhegodnik po khlebnoi torgovly, no.1,M.1927, pp.183-85

These data indicate that the 1926 non-peasant yields had not been quite as large in comparison with peasant yields as had earlier been indicated and indicates that the share of non peasant to all grain production was declining over this period.

The regional breakdown of the sectors of production are given in the following table (see over page).

This table indicates that the production of grain by the non-peasant sector was much more important in the SPR and the CPR than in the other regions. In the SPR they accounted for 3.4% of all grain production in 1927 and in the CPR for 1.9% in NCR,SCR and EPR they accounted for less than 0.8%. The yields were higher in the non SF & CF sector in all the regions apart from the EPR, where they were 5.5% lower. The largest difference between the yields was in the SPR where the yields in the SF & CF sector were over 20% higher than the non peasant sector in 1927.

In the following years we see the beginnings of the rise in Kolkhoz and Sovkhoz production that were to precede the move towards mass collectivisation in the autumn of 1929. The changing share of Sovkhoz and Kolkhoz production in these years and the changes in their yields are indicated in the following tables:

Production		NCR	SCR	SPR	CPR	EPR	USSR	NCR	SCR	SPR	CPR	EPR	USSR
1925	Peasant	11.29	2.87	27.52	17.80	12.93	72.41	8.13	9.44	9.77	6.87	8.41	8.38
	SF & CR	0.10	-	0.96	0.37	0.13	1.56	8.77	-	10.56	7.51	8.33	9.51
	Urban	0.08	-	0.34	0.01	0.09	0.52		-				(10)
	All	11.47	2.87	28.82	18.18	13.15	74.49	8.14	9.44	9.79	6.88	8.41	8.40
1926	Peasant	11.52	3.13	24.22	22.13	15.22	76.22	8.08	9.54	7.90	7.99	8.80	8.18
	SF & CF	0.10	-	0.91	0.41	0.14	1.51	8.70	-	9.97	8.82	8.97	9.54
	Urban	0.08	-	0.26	0.01	0.10	0.45	-	-				(9.8)
	All	11.70	3.13	25.39	22.55	15.46	78.24	8.08	9.54	7.96	8.00	8.80	8.21
1927	Peasant	11.99	2.87	24.96	20.62	13.70	74.13	8.22	8.73	8.03	7.25	7.51	7.75
	SF & CF	0.10	0.01	0.89	0.40	0.11	1.50	8.77	-	9.76	8.66	7.10	9.07
	Urban	0.08	-	0.27	0.01	0.08	0.44	-	-				(9.5)
	All	12.17	2.88	26.12	21.03	13.89	76.07	8.22	8.73	8.08	7.27	7.51	7.78

Source: Computed from Predpolozhitelnyi khlebo furazhnyi balans na 1927/28 sel-khoz god .... M.1927, pp. 28-31.

Notes: Figures in brackets derived from Dubenetsky S.O., 1927, No.1, pp. 25, 26, see previous table.

	Production in mln tons				Yield in cs./hu			
	Peasant	SF	CF	All	Peasant	SF	CF	All
1927	71,40	0,87	0,55	72,81	7,67	8,40	9,53	7,69
1928	71,47/71,28*	0,95/1,13*	0,91	73,32	7,92	10.30	8,78	7,95
1929	67,90/67,70*	1.08/1.33*	2,71	71,74	7,44	8,65	7,99	7.47

	Production				Yield as % of average for all			
	Peasant	SF	CF	All	Peasant	SF	CF	All
1927	98.1	1.2	0.8	100	-0.3%	+9.2%	+23.9%	
1928	97.5/97.2*	1.3/1.5	1,2	100	-0.4%	+29.6%	+10.4%	
1929	94.6/94.4*	1.5/1.9	3,8	100	-0.4%	+15.8%	+7.0%	

Source: Sdvigi v Sel.khoz, M.1932 pp.142-5. and Narodnoye khozyaistvo SSSR,M.1932,pp, 172-3

Note: These figures include the production on state organisations other than Sovkhozy

By 1929 the level of Kolkhoz production had risen rapidly and had outstripped the growing size of Sovkhoz production. There was however a distinct decline in the extent to which Sovkhoz and Kolkhoz yields were larger than normal peasant yields. The regional breakdown of these figures indicates the largest growth in Kolkhoz production in the SPR and the EPR. By the time of the 1929 harvest the share of Kolkhoz production in the former had risen to 5.2% of all production and in the latter to 6%. By contrast the kolkhozy only covered 1.2% of grain production in the NCR at this time and 7.6% in the CPR. Sovkhoz production was also heavily concentrated in the SPR which produced more than half of all Sovkhoz grain. The yields for kolkhozy had declined relative to those for all sectors, quite substantially in all those regions that had

Grain production and yield by sector and region

Grain production in mln.tons.

	NCR	SCR	SPR	CPR	EPR	USSR
1928						
Peasants	11.10	3.78	18.35	21.33	16.77	71.28
SF	0.09	0.01	0.62	0.28	0.14	1.13
CF	0.05	0.02	0.36	0.17	0.31	0.91
All	11.24	3.81	19.33	21.78	17.22	73.72
1929						
Peasants	11.63	3.64	22.61	18.54	11.05	67.60
SF	0.10	0.02	0.75	0.32	0.14	1.33
CF	0.14	0.07	1.28	0.51	0.71	2.71
All	11.88	3.73	24.63	19.37	11.90	71.74

Grain yields in tsentners/hectare

1928						
Peasant	8.4	9.4	6.9	7.7	9.2	7.9
SF	9.5	9.4	11.8	9.0	8.8	10.3
CF	9.7	9.1	7.9	8.3	10.2	8.7
All	8.4	9.4	7.0	7.7	9.2	8.0
1929						
Peasant	8.5	8.6	8.3	6.7	6.0	7.4
SF	10.4	7.0	10.5	7.1	5.6	8.6
CF	10.9	9.2	9.2	7.3	6.5	8.0
All	8.6	8.6	8.4	6.7	6.0	7.5

Source: Narodnoye khozyaistvo SSSR, M.1932, pp.172-3.

experienced a rapid growth in Kolkhoz sowings, but in the NCR Kolkhoz yields were over 26.7% higher than the yields for other grains.

f) General summary and evaluation of the reliability of grain yield data 1918-1929.

The overall picture of the reliability of data on grain yields for this period is fairly similar to that for grain sown area. In the early period when the need for corrections to the basic data was the largest we see a relatively small level of correction being applied, while later when we would have expected a smaller level of corrections to be required a much larger correction appears to have been applied. But unlike the grain sown area data there appears to have been no such systematic attempts to escalate the whole series of grain yields. The level of pre-war grain yields were inflated to provide some comparability with long-term comparisons, but in the shorter term there appears to have been nothing similar to the regular escalation process that we saw for the grain sown area data.

To some extent this would be explicable in terms of the different nature of yields to sown area. Yields fluctuated greatly from one year to another and there was no great correlation between the level of yield in one year and that in another. Uncorrected and uncomparable data would not therefore be as obvious as they would for sown area. The reason for the inflation of pre-war yield data was that this was necessary to justify the inflation in preliminary subjective evaluations of the grain yield. If the peasants were asked to evaluate the grain yield in terms of the average pre-war grain yields, then an inflation in the current figures would require an inflation in the average level of pre-war yields. As in the case for sown area these pre-war inflations were dropped in the 1930s but without any equivalent alterations being made to the 1920s data. This introduced another element of false comparison between the 1920s and the earlier pre-war data.

In the early years of the 1920s the results from the standard methods

of reporting as had been earlier carried out by the correspondents' network of the former Ministry of Agriculture produced totally unsatisfactory results. The statisticians discovered that the peasants were less likely to under-report the level of preliminary harvest yield when given in subjective evaluations than the post-harvest results in physical units. The preliminary grain yield data collected by these subjective measures were used as the basis of grain yield evaluations until 1924 and probably 1925. The results from these investigations were still found to under-estimate the real level of yield and so were corrected by the inclusion of a fairly sophisticated half point correction. This correction was differentiated according to region and according to the evaluated size of the yield. It was consequently far more sophisticated than any of the crude undifferentiated corrections that were being proposed by Gosplan at this time.

The need for a correction at this time was probably necessary and the half point correction was probably justified. The half point correction worked out at about 15-20%. About 60% of this correction was used to offset the effect of the current exceptional level of conscious concealment and under-reporting while about 40% was to offset the normal pre-war level of concealment and under-reporting.

The results of the budget investigations had been used to justify the half point correction. There is some doubt as to how typical the budget data were, and whether adequate adjustments had been made to offset the anticipated higher level of yield that was expected from the more advanced households that tended to be covered inthe budget studies. But by and large we may accept the level of corrections applied in the mid 1920s.

The situation changes however in the late 1920s after the formation of the Expert Soviet, and the introduction of an additional correction to the yield data. This was allegedly justified by the carrying out of

control measurements of reapings and thrashings.

This control process is the direct predecessor of the metrovka that was used to make objective biological yield evaluations in the 1930s, and the use of this method appears to have led to the same effect of the substitution of biological yield evaluations for actual barn yield evaluations. Several statisticians had warned against this at the time[1] but nevertheless the measured yield does not appear to have made an adequate allowance for harvesting losses and the inclusion of'ozadki' and even on non-grain elements[2] would have had a seriously distorting influence. The figures for the late 1920s are therefore not comparable with the figures for the earlier 1920s, and the former would need to be substantially inflated to become comparable with the data of the late 1920s.

An interesting attempt at providing a complete series of grain yield data for this entire period was made by Osinsky early in 1934. In connection with the publication of the 1933 harvest results[3] Osinsky presented a complete series of grain yield figures for all grains covering the territory of the USSR less Transcaucasia, the Central Asian Republics and the Far Eastern Regions. These figures, in their corrected and some in their uncorrected form, covering the period up to 1929 are presented below:

Year	Yield in ts/ha	Year	Yield in ts/ha		
			no correction	corrected	% correction
1904	8.09	1918	5.92	6.92	+16.9%
1905	6.64	1919	6.21	7.21	+16.1%
1906	5.33	1920	5.37	5.69	+6.0%
1907	6.32	1921	4.75	5.04	+6.1%
1908	6.66	1922	7.60	8.06	+6.1%
1909	8.09	1923	7.12	7.12	0%
1910	7.55	1924		6.18	
1911	5.63	1925		8.31	
1912	7.93	1926		8.16	
1913	8.59	1927		7.62	
1914	7.00	1928		7.89	
1915	7.96	1929		7.42	
1916	7.15				
1917	6.87				

1. See above p.441
2. See above p449
3. This was the occasion when Osinsky was forced to present the highly inflated evaluation of the 1933 harvest that was subsequently acknowledg

Source: V.V.Osinsky Itogy Urozhaya 1933g.,M.1934, p.29. This was the reworked stenographic account of Osinsky's speech to the Agrarian Institute of the Communist Academy on 17/1/1934. It was subsequently reproduced in Plan.Khoz., 1934, no.2, pp.75-98.

These figures appear to indicate an acceptable level of corrections: very high (16%) during the troubled period of the civil war, falling to 6% in the early years of NEP and 0% in 1923.

The figures that Osinsky gave for the no correction data for 1920-22 correspond to the early TsSU data with just half a point correction (See source 2b in table SA1)

But the 1923 figure that Osinsky produces as a comparable uncorrected figure was not the figure initially produced by TsSU in 1924 as being comparable with the earlier data. The initial TsSU 1923 figure (with the half point correction) was only 6.4 tsentners per hectare (see source 2b in table SA1). The figure of 7.12 given by Osinsky came from the TsSU mid 1920s series (source 4 in table SA1) and already represented an 11% correction to the basic data. Of course it would have been difficult for Osinsky to explain why there should have been a need for the level of correction to increase from 6.1% in 1922 to 11% in 1923 and so the figures were obscured.

The manipulation of the figures for later years is also a problem. Writing much later, after the war[1], V.M.Obukhov, the former director of TsSU's Institute of Scientific Methodology who had had a close connection with the construction of the original TsSU grain statistics, commented on Osinsky's series of yield figures. Obukhov didn't like the yield figure for 1924. He proposed to substitute his own figure of 5.92 for the one

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1. In fact this was a posthumous publication.

of 6.18, i.e. a deflation of 4.2%. I am a little suspicious of this because Obukhov was carrying out a statistical correlation between grain harvest fluctuations and the weather at the time and 1924 was a year that gave the wrong results so he changed it. He argued that he was justified because the 6.18 tsentner per hectare figure was larger than that indicated by contemporary budget analyses and was the result of a rather arbitrary (proizvolnyi) expert addition made in 1925[1]. This was before the elaborate system of control measurements had been worked out.

We can clearly not expect the yield data to be accurate to within 5% in these years. In later years and especially in 1929 I would expect the reliability to be far less because of the political complications.

But even with a fairly large margin of uncertainty it is still possible to get an indication of the overall pattern of yield fluctuations and despite the uncertainty over the linking of the early and late 1920s series of data, it is I think worth while attempting to compute a comprehensive and unified series of yield data, and even to attempt the more ambitious task of constructing a series with a rough regional breakdown.

I have no quarrels with the half point correction and so I will be mainly concerned with analysing the later corrections. If we compare the all USSR or USSR -SCR grain yield figures for overlapping years in different data series we receive the following indication of the changes in overall yield levels.

	1925 Source/ 1924 source	ExpertSoviet source/ 1925 source
1923	+10.9%	
1924		+3.3%

Sources: See Trudy TsSU Tom VIII, vyp.5, M.1924, p.238
Abrégé des données....,M.1925, pp.62-5
Ezhegodnik po khlebnoi torgovly no.1, M.1928, p.84

1. See V.M.Obukhov, Urozhainost in Meteorologicheskiye faktory, M.1949, p.149. Obukhov had died in 1945.

The regional changes in yield levels from these sources for these years of overlap are given below:

	Expert Soviet/Abrégé 1924	1925	Abrégé/1923 TsSU 1923
NCR	+10.0%	11.0%	+14.0%
SCR			
SPR	-4.8%	-8.4%	+1.1%
CPR	+9.1%	+3.0%	+20.0%
EPR	-1.4%	+6.3%	+21.1%
USSR	+3.3%		+10.9%

Sources: see table above:

Note: I have argued above that the SPR data from Trudy TsSU Tom VIII, vyp 5, probably includes a 20% correction

The position as regards the changes in the regional corrections to yield are almost the exact opposite to regional sown area corrections. Whereas the NCR was the only region not to experience a large increase in sown area correction between the early and late 1920s[1] it received the highest correction to yield. Again it will be necessary to consider two variants of series of regional data: a) one comparable with the early 1920s data and b) one comparable with the late 1920s data. See below

The length of period being studied is too short to provide any indication of trends but these data do indicate -

1. the fairly stable level of grain yields in the NCR at a level possibly somewhat higher than the pre-war level.
2. the fluctuations in the level of grain yields in the SPR around a recovering upwards trend from 1920 to 1925 or 1926, but then a rather unusually severe depression from 1926 until 1929.

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1. See above p. 381 and 384.

Regional yield series in tsentners perhectare

a) comparable with early 1920s data

	NCR	SCR	SPR	CPR	EPR	USSR
1909/13	6.4		8.4	6.7	7.8	7.5
1913	6.8					
1916	6.8		8.2	6.2	7.2	7.0
1920	7.0		7.5	4.4	5.6	6.0
1921	7.8		5.7	3.6	5.6	5.2
1922	7.6		9.4	7.3	8.4	8.4
1923	6.5		8.8	6.0	6.3	7.1
1924	7.0	9.6	6.3	4.4	7.3	6.1
1925	7.3		10.7	6.7	7.9	8.4
1926	7.3		8.0	7.7	8.3	
1927	7.2		8.9	7.1	6.8	
1928	7.3		7.5	7.4	8.6	
1929						

b) comparable with late 1920s data

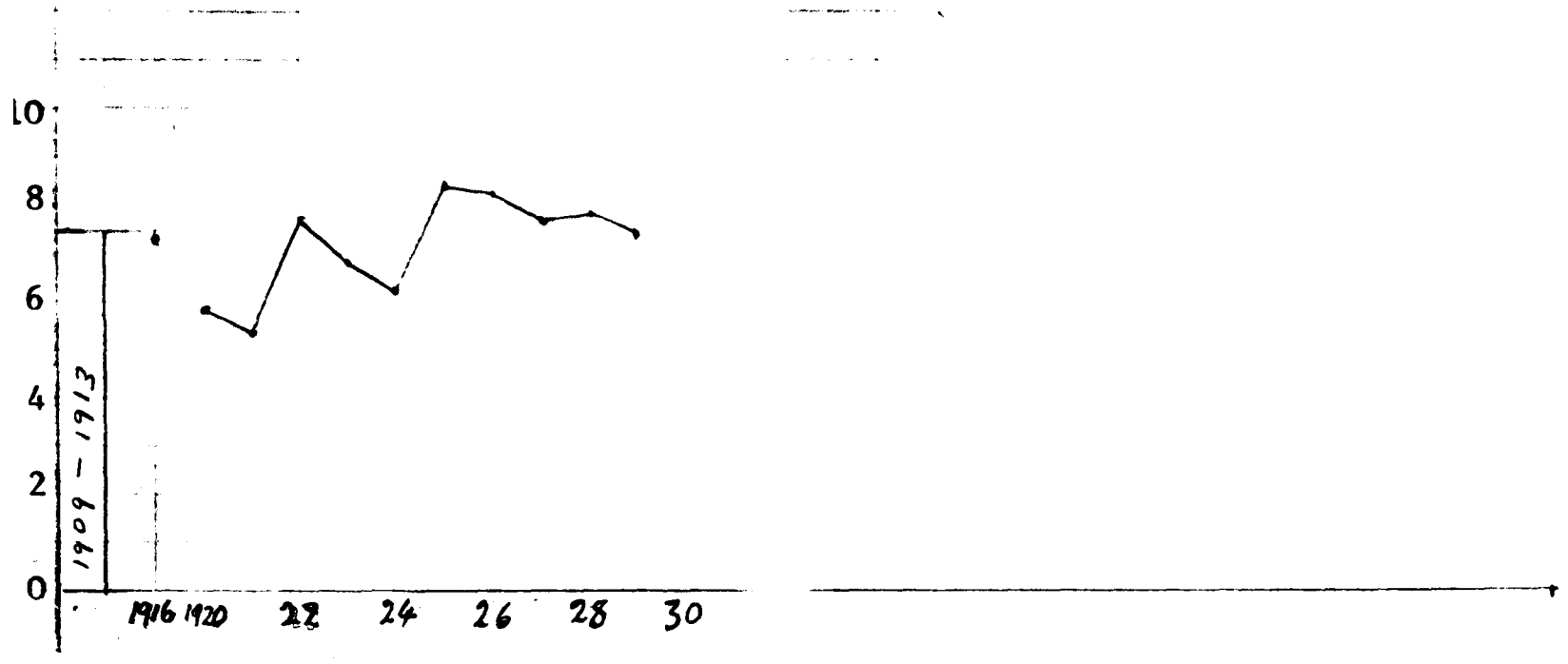
1909/13	7.0		8.0	7.3	7.8	
1913						
1916	7.5		7.8	6.8	7.2	7.2
1920	7.7		7.2	4.8	4.7	
1921	8.6		5.4	3.9	4.7	
1922	8.4		9.0	7.9	7.0	
1923	7.2		8.4	6.5	6.3	7.3
1924	7.7	9.1	6.0	4.8	7.2	6.3
1925	8.1	9.4	9.7	6.9	8.5	8.3
1926	8.1	9.3	8.0	7.9	8.9	8.2
1927	8.0	8.3	8.1	7.3	7.3	7.5
1928	8.1	9.4	6.8	7.6	9.3	7.9
1929	8.6	8.6	8.4	6.7	6.0	7.5

3. the CPR yields also fluctuated around a rising trend until 1926, but they then remained fairly high.

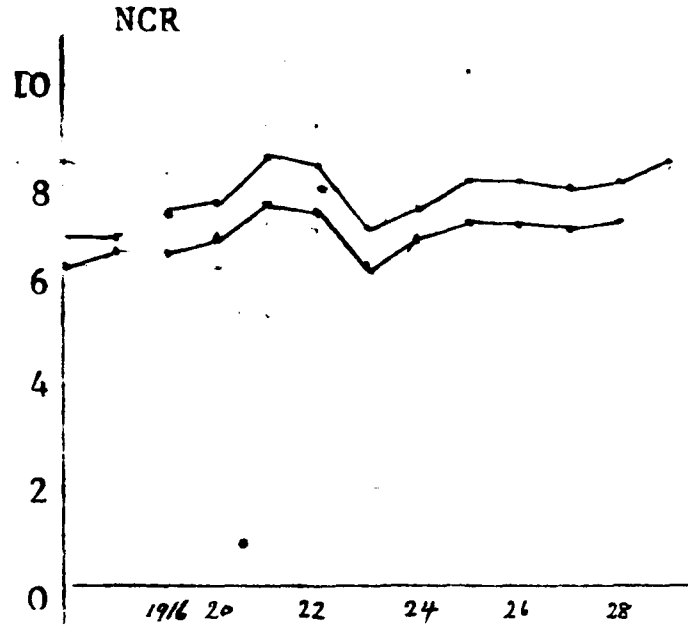
4. the EPR yields showed the most favourable development of yield in all the regions. They rose to well above their average pre-war level in the mid and late 1920s. However they were recorded to have suffered a sharp decline in 1929.

5. the high yields in the CPR and EPR from 1926 to 1928 to a large extent compensated for the depression in the SPR.

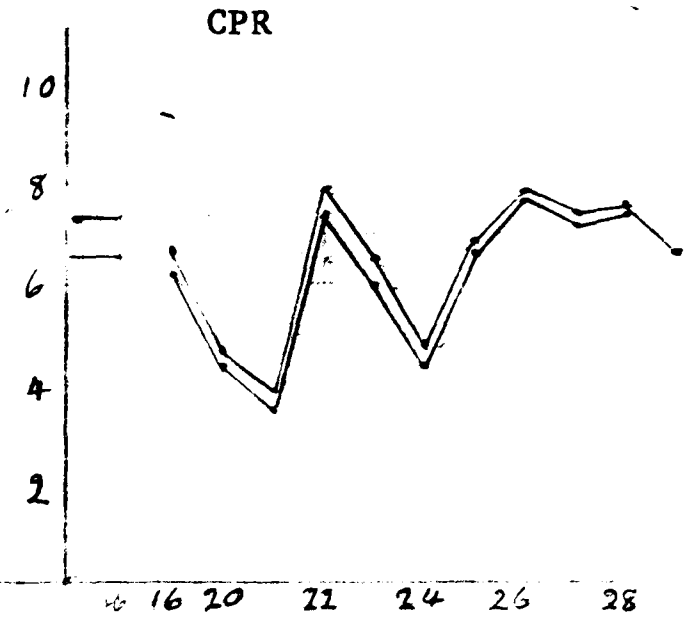
Regional Grain Yields in tsentners per hectare



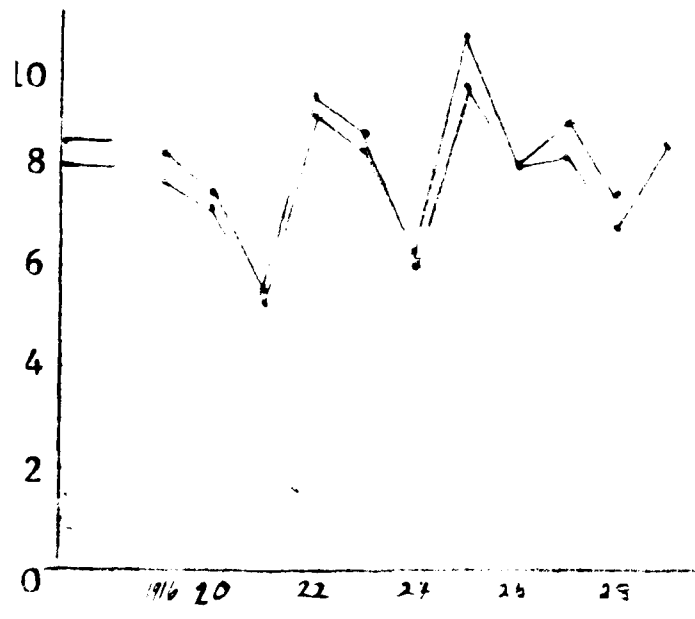
NCR



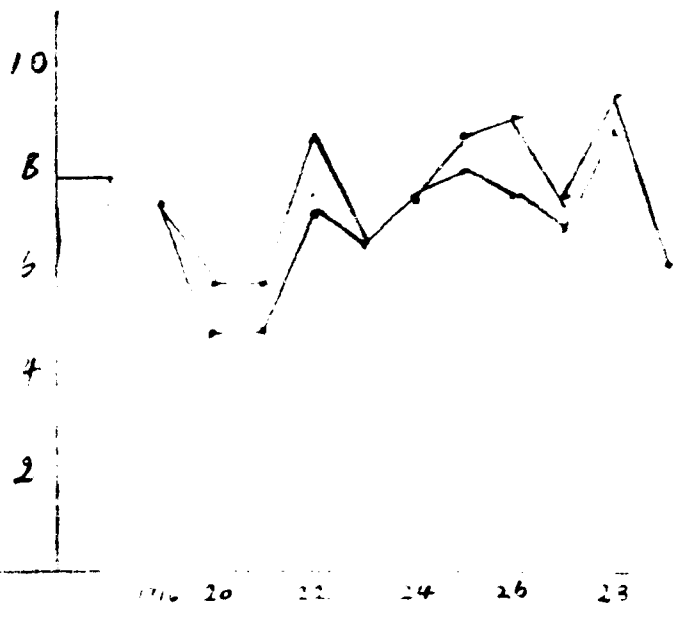
CPR



SPR



EPR



4. Grain production

Since I have already dealt in some detail with the sources of data for the separate components that combine to form grain production there will clearly be no need for me to repeat this discussion. This chapter will consequently be much more brief than the earlier chapters and will be mainly concerned with presenting the available grain production data and my own complete series of regional grain production data.

The available series from different sources have again been reproduced in two summary tables: Prod.1 listing the major available grain production series for all the USSR or the USSR less the SCR, and Prod.2, listing the major available series with a regional breakdown. These summary tables are given over page.

In the early years of NEP TsSU calculated its grain production data simply by multiplying together the regional figures for grain sown area and the average grain yields, and summing the total. The earliest series of post-revolutionary production figures were those which Popov produced for the Tenth Party Congress in May 1921 . These figures indicated a level of grain production for the USSR less the SCR in 1920 that was less than half the normal pre-war level i.e. just under 29.5 million tons in comparison with a normal pre-war harvest of 65.5 million tons for the same area[1].

Such a level of decline would have already represented an extremely critical position and it was the acceptance that Russia was already in this extremely critical position that eased the carrying out of the change in policy from requisitioning to a tax in kind that heralded the beginning of

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1. See P.I.Popov, Khlebnaya produktsiya Sovetskoi i federiryuemikh snyeyu Respublik, M.1921, p.4.

The major available series of data on grain production in mln.tons.

	1	2	3	4	5	6	7	8	9	10	11	
1909/13	65.5*			63.1*								
1913						88.8						
1916				57.04*			61.5*					
17				54.9								
1920	29.5*	29.0*	34.6*	34.1*	41.9*	45.7						
21		23.5*	27.7*	27.7*	35.2*	32.3						
22		30.5*	36.2*	36.2*	45.7*	53.4						
23		29.2*	35.6*		48.5*	51.9	47.4*					
24							42.7*	45.7	51.6			
1925							63.4*	66.6	72.4	72.7		
26									76.3	76.6		
27									74.1	71.7		
28										71.5	73.3	
29											71.7	

Note: * USSR less SCR

All grains production by region from various sources in mln.tons

Source	Year	NCR	SCR	SPR	CPR	EPR	USSR	USSR -SCR
2	1913	7.16	-	33.12	22.12	12.42		74.82
	1916	6.74	-	24.57	19.96	(11.0)		62.27
	1917	-	-	-	-	-		-
	1920	3.34	-	(8.00)	7.15	5.96		24.45
	1921	4.63	-	(8.39)	6.10	5.92		25.05
3a	1909/13	6.86	-	27.66	17.58	10.96		63.07
	1916	6.27	-	23.91	15.16	11.71		57.04
	1917	5.45	-	24.05	10.95	14.43		54.88
	1920	3.79	-	16.23	5.99	8.11		34.11
	1921	4.56	-	12.51	5.01	5.59		27.67
	1922	5.00	-	15.89	8.67	6.67		36.23
3b	1920	3.56	-	13.75	6.43	5.26		29.00
no corr-ectn.	1921	4.43	-	10.38	4.66	3.98		23.46
	1922	4.83	-	13.10	8.61	3.97		30.51
	1923	4.49	-	13.80	7.59	3.36		29.24
	1920	4.03		16.51	7.75	6.29		34.58
with corr-	1921	5.02		12.32	5.58	4.74		27.67
	1922	5.47		15.63	9.69	4.75		36.23
ectn.	1923	5.05		16.68	9.62	4.25		35.59
4	1916	7.04		23.85	19.10	11.51		61.49
	1923	6.52		20.40	13.67	6.77		47.35
	1924	7.48	2.99	15.56	10.65	9.02	45.69	42.70
	1925	7.97	3.27	27.82	16.62	10.95	66.62	63.35
5	1924	10.40	2.91	16.01	11.59	10.67	51.57	
	1925	11.30	2.87	27.53	17.81	12.93	72.43	
	1926	11.52	3.14	24.23	22.18	15.22	76.28	
	1927	11.99	2.87	24.95	19.86	13.70	74.13	
6	1925	11.33	3.37	26.11	17.99	13.86	72.66	
	1926	11.54	3.36	23.46	21.73	16.48	76.56	
	1927	11.44	3.03	23.91	19.60	13.74	71.72	
	1928	10.80	3.70	17.98	21.70	17.36	71.54	
7	1928	11.23	3.80	19.33	21.78	17.22	73.32	
& 8a.	1929	11.88	3.73	24.63	19.37	11.90	71.74	

Sources of data for table on Grain Production Prod.1.

1. P.I.Popov Khlebnaya produktsiya Sovetskoi i federiryuemikh snyeyu Respublik M.1921, p.4.

2. Trudy TsSU, Tom VIII, vyp.4, M.1924, pp.386-9
&
3 1923 values from Trudy TsSU, Tom VIII, vyp.5, M.1924, pp.185-6

2 refers to data excluding the half point correction and 3 refers to data including it.

4. Trudy TsSU, Tom XVIII, M.1924, pp.131-3

5. VS, 1923 No.7/12 p.182

6. S.G.Strumilin, Plan. khoz. 1924, No.4-5, p.167

7. Abrégé des données statistiques de l'URSS, M.1925, pp.61-8
&
8

9. Ezhegodnik po khlebnoi torgovly , No.1, M.1928, pp.83-5

10. Statisticheskii Spravochnik SSSR 1928, M.1929, pp 178-9

11. Narodnoye khozyaistvo SSSR, M.1932, pp.172-3.

NEP.

The indications of a continued fall in sown area and drastic fall in yield in the following year persuaded TsSU that grave as the situation must have been in 1920, it could not have been quite as grave as it initially appeared. TsSU began therefore from 1922 to apply a quite substantial upward correction to its production data by applying the ½ point correction to its yield data.

The application of the ½ point correction increased the evaluation of the 1920 harvest from 29.5 mln.tons to 34.1 mln.tons. The 1921 harvest level was then calculated to have been 27.7 million tons,[1] 6.4 million tons less than the new 1920 level, although only 1.8 million tons less than the initial evaluation of the 1920 harvest. Although the sown area continued to fall in the following year 1922, the good yield in this year brought some relief to a very desperate situation and caused an overall rise in production by 30% according to these early TsSU figures. The regional changes that accompanied these overall movements in the level of grain production as indicated in these early TsSU series of data are given below:

in mln tons

	NCR	SCR	SPR	CPR	EPR	USSR -SCR
1909/13	6.9		27.7	17.6	11.0	63.1
1920	3.8		16.2	6.0	8.1	34.1
1921	4.6		12.5	5.0	5.6	27.7
1922	5.0		15.9	8.7	6.7	36.2
1909/13	100		100	100	100	100
1920	55.1		58.5	34.1	73.6	54.0
1921	66.7		45.1	28.4	50.9	43.9
1922	72.5		57.4	49.4	60.9	57.4

Source: Trudy TsSU, Tom XVIII, M.1924, pp.386-9.

1. See Trudy TsSU, Tom XVIII, M.1924, pp.386-9

Already in 1920 the drop in production in the CPR was much more serious than in the other regions, The further decline in 1921 had disastrous effects. It should be noted that the level of production in the NCR was already increasing in 1921 and that in that year it rose 21% above its 1920 level. By 1922, even with this relatively uncorrected data the improvement in the position in the NCR is quite clear.

By the time of the 1923 harvest evaluation Popov and the leadership of TsSU were prepared to accept that a further 21-35% correction was required to the basic production data even after the half point had been added. But as mentioned above they were not prepared to state how this 21% should be allocated between sown area and yield. The new figures were announced by Dubenetsky in the presence of Popov, Obukhov, and an enlarged session of the collegium of TsSU on July 20, 1923[1]. The new figures are presented over page in comparison with the earlier available figures:

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1. See VS, 1923, no.7-12, p.180.

Early TsSU data in mln tons

	No correction	½ point correction	correction as %	July 1923 data	additional correction	total correction
1920	29.00	34.58	+19.2%	41.9	+21.2%	+44.5%
1921	23.46	27.67	+17.9%	35.2	+27.2%	+50.0%
1922	30.51	36.23	+18.7%	45.7	+26.1%	+49.8%
1923	29.24	35.89	+21.7%	48.5	+35.1%	+65.9%

Sources: See Trudy TsSU Tom VIII, vyp.4,M.1924,pp.386-9 and VS ,1923, no.7/12 p.182.

Despite the admission of the need for this very large correction Gosplan SES, Strumilin, Vishnevsky and Groman still pressed for even higher corrections. In his article 'Towards the reform of harvest statistics' in May 1924, Strumilin cited the current recommended Gosplan SES series of production data which exceeded Popov's July 1923 figures by 7% for 1923,

in mln tons

	Popov's July 1923 data	Strumilin's data	% difference
1920	74.19	45.7	+9.1%
1921	35.2	32.3	-8.2%
1922	45.7	53.4	+16.8%
1923	48.5	51.9	+7.0%

Sources: See S.G.Strumilin, Plan.Khoz.,1924, no.4-5, p.167

Strumilin's data had been constructed using the balancing method of drawing up rough utilisation balances as described below. His series indicated a much lower decline in 1921, but then a more rapid recovery. The conflict between TsSU and Gosplan continued over these values.

In 1925 TsSU produced its last series of data before the 1926 reform. These are listed below: in mln tons

	NCR	SCR	SPR	CPR	EPR	USSR	USSR -SCR
1916	7.0		23.9	19.1	11.5		61.5
1923	6.5		20.4	13.7	6.8		47.4
1924	7.5	3.0	15.6	10.7	9.0	45.7	42.7
1925	8.0	3.3	27.8	16.6	11.0	66.6	63.4
1916	100		100	100	100		100
1923	92.6		85.5	71.6	58.8		77.0
1924	106.3		65.2	55.8	78.4		69.4
1925	113.2		116.6	87.0	95.1		103.0

Source: see Abrégé de données statistiques de l'URSS, M.1925, pp.61-8.

This series was comparable with the one given in July 1923 although the preliminary 1923 figure cited at that time was somewhat reduced.

These data indicate that the sharp improvements in production in 1925 affected all regions, but that production in the CPR still lagged significantly behind. The indication of conditions in the EPR is a little distorted because the 1916 level of production there was significant higher than the pre-war level had been.

The final three series of production data that will be considered were all produced by the Expert Soviet after 1926. The earliest Expert Soviet series of production data was constructed in 1927 and had values 7.0% and 8.7% higher than the earlier TsSU series for the years 1924 and 1925. These figures are produced below: (in mln. tons)

	NCR	SCR	SPR	CPR	EPR	USSR
1924	10.4	2.9	16.0	11.6	10.7	51.6
1925	11.3	2.9	27.5	17.8	12.9	72.4
1926	11.5	3.1	24.2	22.2	15.2	76.3
1927	12.0	2.9	25.0	19.9	13.7	74.1

Source: see Ezhegodnik po khlebnoi torgovly. no.1, M.1928, pp.33-5.

They indicate a fine harvest in 1926 caused by a record post-revolutionary harvest in all regions apart from the SPR which had a harvest just 12% below its 1925 record. The following year presented a harvest only 3% lower overall than this record harvest. The NCR and SPR increased production a little over the previous year's levels but production in the other groups fell.

The 1928 harvest results indicated little overall change in this level of production, despite the fall in the sown area level. The level of production in the SPR fell by a further 25% from its 1927 level, but there was a good harvest in the CPR and a record harvest in the EPR.

in mln tons

	NCR	SCR	SPR	CPR	EPR	USSR
1925	11.4	3.4	26.1	18.0	13.9	72.7
1926	11.5	3.4	23.5	21.7	16.5	76.6
1927	11.4	3.0	23.9	19.6	13.7	71.7
1928	10.8	3.7	18.0	21.7	17.4	71.5

Source: Statisticheskii Spravochnik SSSR, 1928, M.1929, pp. 178-9

The results of the 1929 harvest indicated a slight overall decline on the overall level of production caused mainly by a very sharp fall in production in the EPR and a moderate decline in the CPR. The SPR was reported to have increased its level of production in this year:

in mln tons

	NCR	SCR	SPR	CPR	EPR	USSR
1928	11.2	3.8	19.3	21.8	17.2	73.3
1929	11.9	3.7	24.6	19.4	11.9	71.7

Source: Narodnoye khozyaistvo SSSR, M.1932, pp.172-3.
Note: these figures include Sovkhoz and Kolkhoz production.

An account of the grain production by the non-peasant sector has already been included in the earlier chapter . I will consequently pass directly on to the presentation of my two series of grain production statistics that span this entire period. The construction of these series follows on directly from the series of sown area statistics and yield statistics that have already been presented . These two series of grain production data a) in units comparable with the early 1920s data and b) in units comparable with the late 1920s data are listed below: See over page.

These series of data indicate the magnitude of the decline in production in 1921 and the recovery of production by the late 1920s for the different regions. Production in the NCR and EPR in the late 1920s according to both variants was above its pre-war level while the level of production in the two major producer regions the CPR and SPR appears to have remained below the average pre-war level.

Regional Grain production data in mln,tons

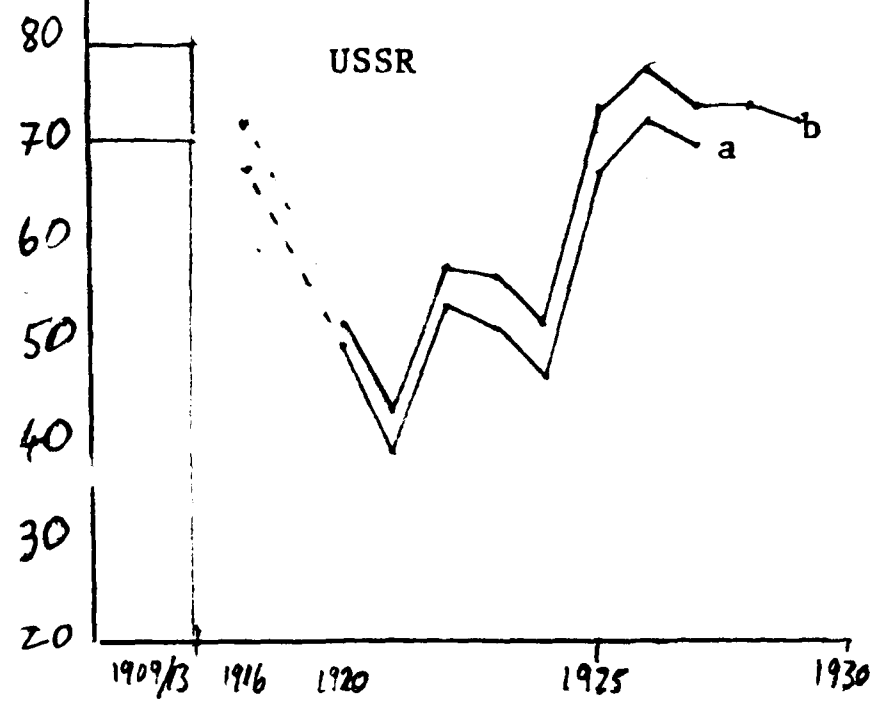
a) comparable with early 1920s data

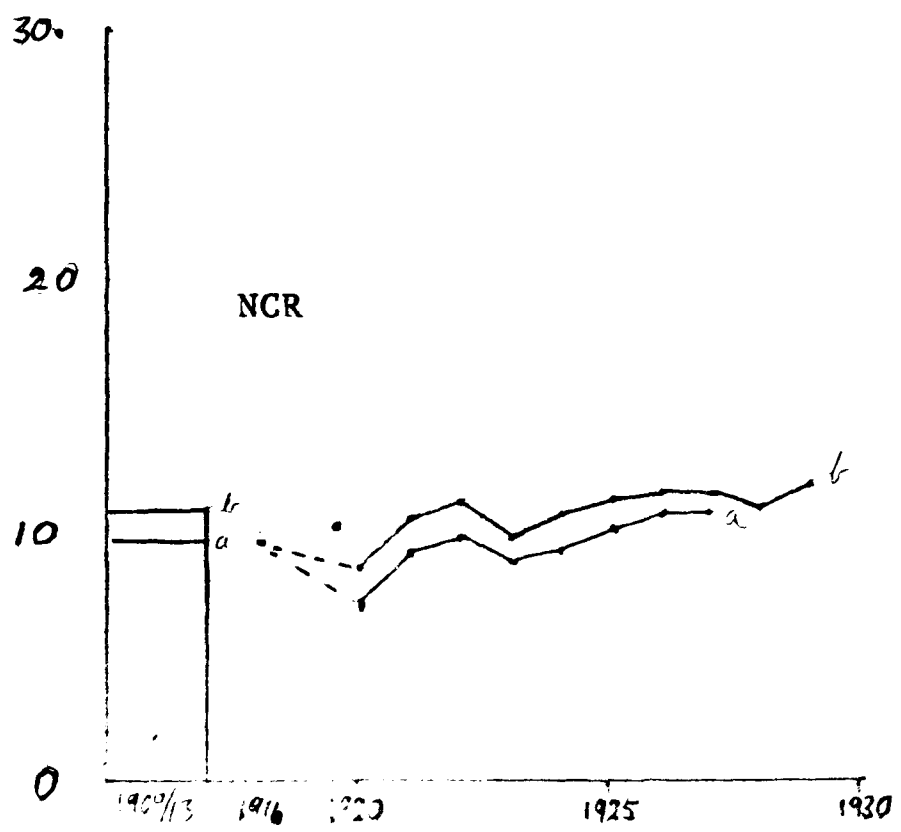
	NCR	SCR	SPR	CPR	EPR	USSR
1909/13	9.0	(2.6)	26.1	20.5	10.8	(69.0)
1913						
1916	9.8	(2.8)	23.4	20.3	11.5	67.8
1920	7.2	(2.8)	18.8	11.5	8.1	48.4
1921	9.0	(2.8)	11.1	8.3	6.6	37.8
1922	9.8	(2.8)	17.9	15.0	7.8	53.3
1923	8.6	(3.0)	20.3	11.9	6.8	50.6
1924	9.4	(3.1)	15.5	9.2	8.9	46.1
1925	10.0	(3.1)	27.6	14.8	10.8	66.3
1926	10.4	(3.1)	24.8	18.4	13.4	70.1
1927	10.4	(3.1)	25.4	17.6	11.5	68.0
1928						
1929						

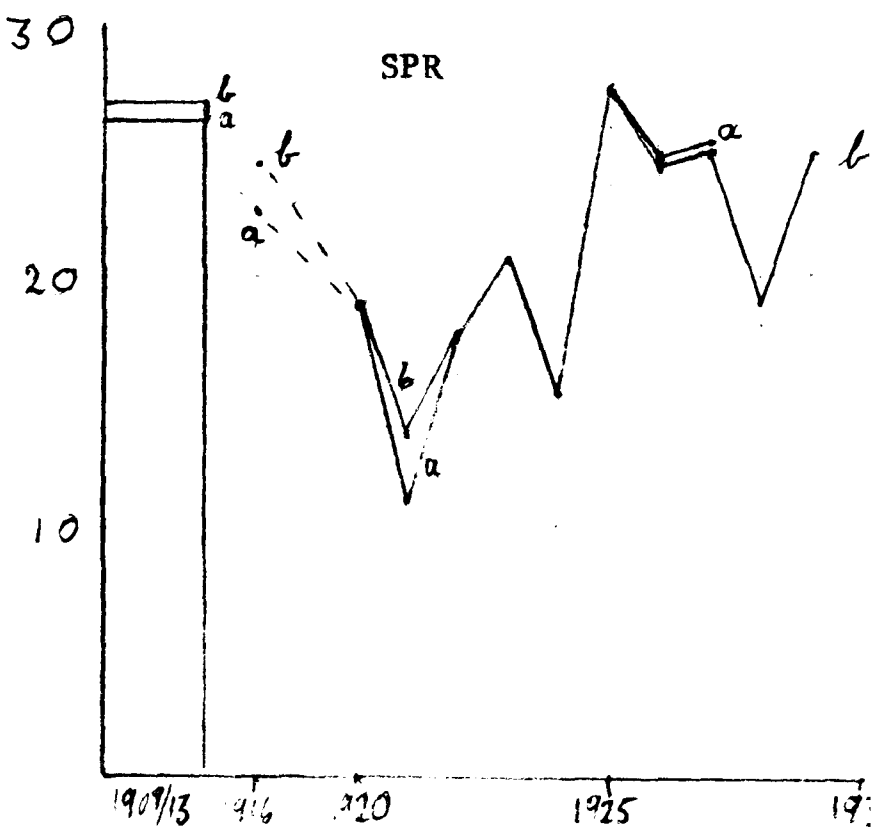
b) comparable with late 1920s data

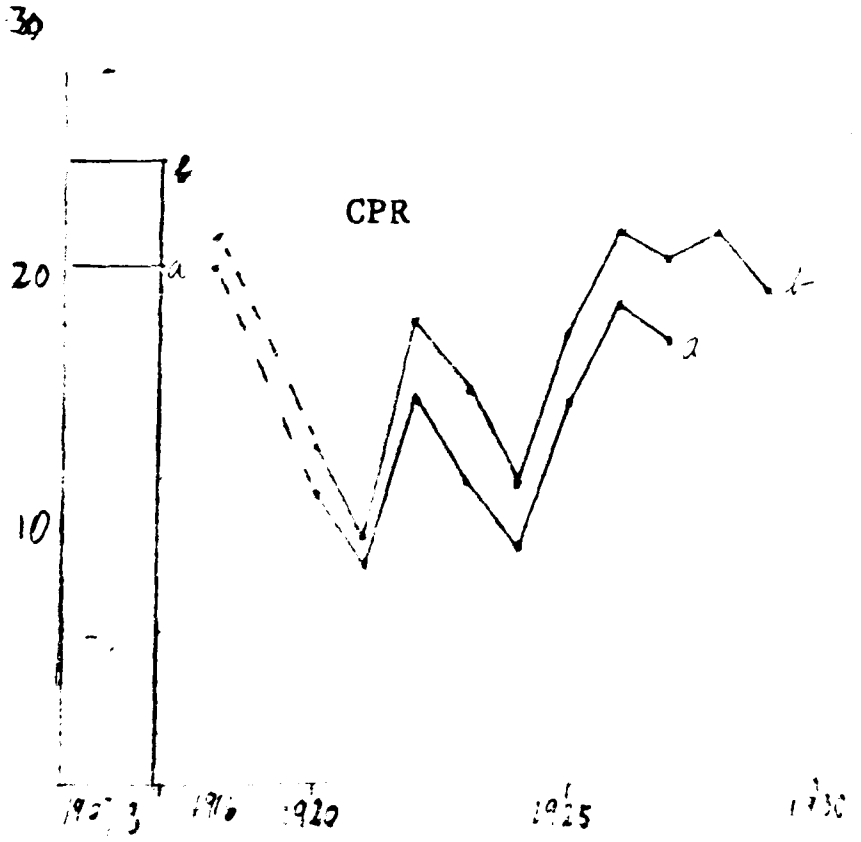
1909/13	10.9	(3.2)	27.4	24.6	11.9	78.0
1913						
1916	9.8	(3,2)	24.4	21.3	12.9	71.8
1920	8.2	(3,2)	18.6	13.2	8.7	51.9
1921	10.1	(3,2)	13,8	9.7	7.0	43.8
1922	10.9	(3.4)	17.7	18.0	7.1	57.1
1923	9.5	(3.4)	20.8	15.3	7.8	56.8
1924	10.4	3.5	15.9	11.9	10.2	51.9
1925	11.2	3.5	27.0	17.7	13.4	72.8
1926	11.4	3.6	24.1	21.5	15.8	76.4
1927	11.4	3.2	24.7	20.1	13.5	72.9
1928	10.9	3.8	18.8	21.5	17.5	72.5
1929	11.9	3.7	24.5	19.3	11.9	71.3

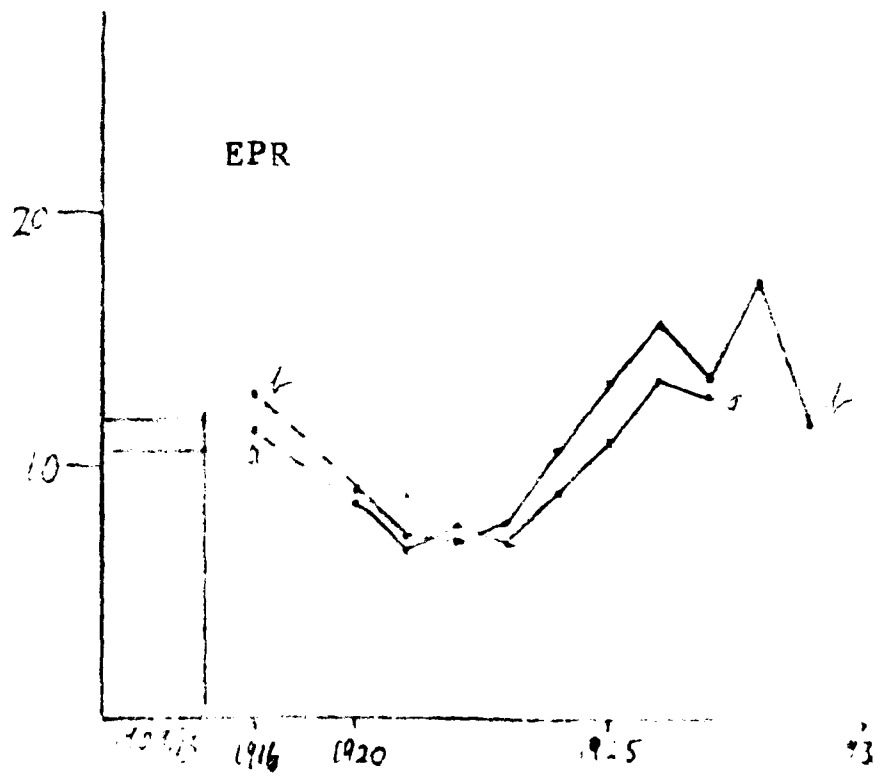
Grain production in mln.tons in series of data a) comparable with the TsSU data of the early 1920s and b) with the Expert Soviet data of the late 1920s in mln.tons.











5. Grain utilisation data by item

This chapter is similar in purpose and in structure to chapter three of part one of this thesis. In it I consider separately data on all the different elements included in the grain utilisation balance and I also conclude with a brief survey of some of the available data characterising some of the main elements in the distribution of grain. However, the wealth of material available in this period is much larger than for the earlier period. The construction of an operational grain forage balance had become one of the major tasks of TsSU, and TsSU consequently directed much of its statistical work towards improving the state of knowledge and reliability of statistical indicators on several elements in the balance which were known with the least degree of certainty. Special mass investigations were made of the levels of personal consumption, livestock fodder consumption, and changes in the level of peasant stocks. Apart from this the transportation data were much more systematically processed and the appearance of state grain collectors on the grain market, dominating large-scale inter-regional trade in grain from a very early period, also led to a great improvement in the data on grain distribution. In this period the available grain utilisation data were more detailed and richer than at any other period.

The order in which the separate utilisation and distribution items will be considered is the same as in the earlier part of the thesis namely:

a) seed use,
b) personal consumption,
c) livestock feed,
d) industrial use,
e) army,
f) changes in stock,
g) exports,
h) losses,
i) transportation data.

a) Grain utilisation as seed

As already mentioned above, calculating grain yield in terms of production per unit quantity of sown grain (v samakh) was the traditional way of describing grain yields. Although this indicator was not used by TsSU in the period that we are considering, it would certainly still have been used by the peasants, by peasant correspondents and by the local statistical agents. The peasant would have had a more exact knowledge of the quantity of grain that he had sown than of the area over which he had sown it, or even of the total harvest that he collected from it. The peasants may well have calculated their sown areas from their knowledge of the quantity of grain used as seed and their normal seeding rates.

Questions concerning seeding rates were included in the spring investigation, which was mainly concerned with the spring sown area, and in the autumn investigation, which was mainly concerned with the harvest results and the winter sowings. As explained above, these investigations took the form of detailed questionnaires which were distributed by the local statisticians on a random basis[1]. There can be little doubt that the peasants would have known what their seeding rates were, and that the local statisticians would have known whether reasonable returns were being made on this item.

The earliest post revolutionary data on seeding rates were published in Trudy TsSU, Tom VIII, vyp.1, in 1921. These data were given in a highly disaggregated form for the years 1918, 1919 and 1920 in comparison with the 1905/14 rates, for separate grains in separate areas. These data for the RSFSR and UkSSR are given in the following table:

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1. See above. pp 327, 426.

Seed rates in tsentners per hectare

RSFSR	Winter Rye	Winter Wheat	Spring Rye	Spring Wheat	Barley	Oats	Millet	Buckwheat
1905-14	1.32	1.33	1.33	1.38	1.44	1.72	0.31	1.05
1918	1.33	1.33	1.23	1.38	1.42	1.72	0.27	0.96
1919	1.35	1.32	1.32	1.44	1.51	1.78	0.30	1.00
1920	1.38	1.38	1.36	1.47	1.48	1.81	0.30	0.96
UkSSR								
1905-14	1.30	1.32	1.21	1.29	1.33	1.42	0.46	1.15
1918	1.17	1.24		1.20	1.12	1.15		0.75
1919	0.87	0.94		0.90	0.90	1.00	0.18	
1920	1.30	1.32	1.06	1.29	1.30	1.36	0.45	0.90

Source: Trudy TsSU, Tom VIII, vyp.1, M.1971 pp.264-271

Note: 1905-14 data refer to seed rates for peasant allotment and private lands taken together.

The slight increase in the seed rates in the RSFSR in comparison with the pre-revolutionary period would probably appear a little less if these rates had been compared with the pre-war rates for private allotment lands only, but it is doubtful if that would have made much difference. It is interesting to note that the reported seed rates for the major food grains were quite significantly higher in 1920 than they had been in 1918 and 1919, and they may even have been higher than the pre-war levels. This would indicate that there was no shortage of seed in 1920 and that if there really was a serious decline in the level of sown area, it would have to be explained in terms of some other factor e.g. shortage of draft power or simply shortage of incentive to sow more land.

The later volumes of Trudy TsSU provided data on seed rates in a more manageable aggregated form. The regional data for the seed rates for all grains from 1920-23 are presented in the following table:

Seed rates in tsentners per hectare

	NCR	UkSSR	Prod.regions in Eur.RSFSR	Asiatic RSFSR	All RSFSR & UkSSR
1920	1.65	1.12	1.21	1.24	1.23
1921	1.65	1.12	1.24	1.20	1.24
1922	1.63	1.09	1.14	1.11	1.20
1923	1.65	1.12	1.21	1.14	1.23

Sources: 1920-1922 in Trudy TsSU, TomVIII,vyp.4,pp.398-401
1923 in Trudy TsSU, Tom VIII,vyp.5, pp.143-47

Note: No figures for sowings in 1924 were given in Trudy TsSU, Tom VIII,vyp.7, where other 1924 data appear

Here the effect of seed shortages after the famine year of 1921 are readily visible in the UkSSR and the CPR (the producer regions of the European part of the RSFSR). Although the 1921 seed rates for the Asiatic part of the RSFSR were somewhat low, the seed rates for the rest of the country had remained fairly high in 1921 indicating no severe shortage of grain in that year.

In comparison with the pre-war data, all these post-revolutionary rates with the exception of the producer regions of European RSFSR[1] are much lower: (in tsentners per hectare)

	NCR	UkSSR	CPR	EPR	USSR
1905/14	1.71	1.29	1.12	1.34	1.32

Source: Trudy TsSU, Tom VIII, vyp.1, M.1921 pp.264-370

This may be partly due to a long term trend to more efficient use of seed as well as the severe conditions of the early 1920s.

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1. This may be due to the different regional coverage.

Later TsSU data from the 1923/24 balance of the national economy[1] indicated slightly higher overall seeding rates. The data given in this balance are extremely detailed and allow us to give a detailed breakdown of seeding rates by region and by grain:

Grain seeding rates in tsentners per hectare sown in 1923/24

Grain	NCR	SCR	SPR	CPR	EPR	All USSR
Rye	1.53	0.95	1.23	1.30	1.27	1.33
Wheat	1.51	1.31	1.21	1.17	1.24	1.22
Oats	2.11	1.22	1.42	1.69	1.59	1.74
Barley	1.61	1.42	1.20	1.26	1.24	1.28
Maize	-	0.46	0.28	-	-	0.32
Buckwheat	1.25	-	1.18	1.08	0.84	1.13
Millet	0.31	0.41	0.45	0.31	0.26	0.33
Other	1.64	0.88	1.41	1.29	0.91	1.26
All	1.66	1.11	1.14	1.25	1.26	1.26

Source: computed from Trudy TsSU, Tom XXIX, M.1926, p.102

A comparison of this regional by grain matrix with the pre-war 1905/11 matrix given above (p.71) indicates that the decline in overall and regional seed rates is not a consequence of the change in significance of the types of grain sown.

Although seed rates may be calculated from the available grain forage balances for the later period, there appear to be few direct publications of the results of later investigations of seeding rates. And it is uncertain whether the seed figures given in the later balances are based on the unpublished results of later investigations of the actual seeding rate or whether they were based on applying earlier observed seed rates to the reported sown area figure. The seed norms calculated from later grain forage balances must therefore be treated with some degree of caution.

1. Trudy TsSU, Tom XXIX, M.1926, p.102.

A sample of such seed norms in comparison with the 1923 norms is presented below.

Regional seed norms undifferentiated by grain as computed from some of the later grain forage balances are indicated below:

(in tsentners per hectare)

	NCR	SCR	SPR	CPR	EPR	USSR	All CR	All PR
1923/24	1.66	1.11	1.14	1.25	1.26	1.26	1.55	1.21
1925/26	1.62	1.03	1.13	1.12	1.22	1.21	1.51	1.15
1926/27	1.62	1.03	1.13	1.12	1.21	1.21	1.51	1.15

Sources: see Trudy TsSU Tom XXIX, M.1926 p 102 and Statisticheskii Spravochnik SSSR, 1928, M.1929, p.228

And seed norms for the different grains, undifferentiated by region as computed from the 1928-29 grain balances, are presented below in comparison with the 1923/24 norms:

(in tsentners per hectare)

	1923	1928	1929
Rye	1.33	1.46	1.32
Wheat	1.22	1.22	1.13
Oats	1.74	1.51	1.74
Barley	1.28	1.12	1.34
Maize	0.32	0.26	0.20
Buckwheat	1.13	1.21	
Millet	0.33	0.29	
Other	1.26	1.84	———
All	1.26	1.26	1.26

Sources: see Trudy TsSU, Tom XXIX, M.1926, p 102
Materialy po balansu Nar.Khoz.SSSR za 1928,1929,1930gg.,M.193? pp. 254-26

These seed rates would appear to indicate a slight decline in the overall seed rate in the middle years of the decade and an increase again towards the end of the decade.

The 1925/26 and 1926/27 seed rates appear to be based on the same norm. The 1928 and 1929 seed rates indicate a fairly significant differenc in 1929 the seed rates of food grains were much lower than in 1928, while those of feed grains were higher. This may reflect the pressure on food

grains at this time. It appears to be too significant to explain in terms of regional changes in sown area.

No attempt will be made here to convert these seed rates into the quantity of seed used. This depends on the level of sown area accepted and will be considered in part four when I draw together the evidence from all different sources. But by way of giving a rough indication of the relative proportions involved, I have listed below the share of grain used as seed according to the different grain utilisation balances of the time.

The proportion of grain used as seed for the different grains at different periods is indicated in the table below (%)

	Rye	Winter Wheat	Spring Wheat	Oats	Barley	Maize	Buckwheat	Millet	Other	All
1880-1900										
landowner	16.7	17.5	20.8	22.2	19.2		22.7	4.8		
peasant	21.3	20.0	23.8	27.0	22.2		25.6	5.5		
1923/24	18.1	20.1		25.6	19.6	2.5	20.5	4.5	18.8	18.1
1928	19.0	16.5		17.5	16.0	2.7	20.9	5.5	22.6	16.5
1929	18.7	20.2		19.8	13.8	2.5	21.5	5.2	28.1	17.9
1930	17.2	15.9		17.9	13.4	3.0	21.2	5.2	15.9	15.7

Sources: See appendices

The proportion of grain used as seed in the different regions in different years is indicated in the table below (%):

	All CR	NCR	SCR	All PR	SPR	CPR	EPR	All USSR
1923/24	20.4	24.5	11.6	17.5	13.5	21.9	20.3	18.1
1925/26	18.7	20.5	11.8	14.9	12.5	17.4	16.4	15.6
1926/27	18.4	20.5	10.8	14.4	14.4	14.4	14.4	15.2

Sources: See appendices

Note: The difference in the proportions between the early and mid 1920s will be less if a correction is added to the 1923/24 yield data.

b) Data on grain used as food

The organisation of this section is similar to that given above in Part One, chapter 3, section b, and is a continuation of that section. It is divided into two parts; i) the available population data and ii) the available data on grain consumption norms.

i) Population data 1918-1929

During this period there were three censuses; a general demographic census in 1920, an urban demographic census in 1923 and another general demographic census in 1926. The statisticians had hoped to carry out another census in 1930 but that was delayed until much later. The 1920 census was carried out at a time of considerable disruption, when the Civil War was still being carried on. It consequently fails to cover all areas and is of some doubtful reliability in those areas that it does cover. The results of the 1916 and 1917 agricultural census were used in places to complete the coverage of the 1920 census .

An early account of the 1920 population data together with the grain production data they were assumed to relate to was given by Popov to the Xth Party Congress in March 1921.

(Population in mlns.)

	All	Urban	Rural
Cons.R.	25.06	3.78	21.28
(Moscow)	1.03	1.03	
Ukraine	23.38	3.90	19.40
Krym	1.85	0.34	1.50
Yugo Vostok	7.42	1.27	6.15
All SPR	32.65	5.51	27.05
CPR	40.44	4.45	35.99
Siberia	11.90	1.19	10.71
All	111.08	16.04	95.04

Source: P.Popov, Khlebnaya Produktsiya Sovetskoi i federirovannykh s nyeyu Respublik, M.1921, p.15.

Later in 1921 TsSU produced a much more detailed comparison of the 1920 census data with the pre-war census data (1897) and with an estimate of the 1914 population in millions:

	1897	1914	1920 All	1920 Urban	1920 Rural	Annual average growth 1897-1914	Actual decline 1920 - 1914 in mln.	Actual decline 1920 - 1914 in %
NCR	27.50	35.15	30.65	5.37	25.28	+1.5%	-4.5	-12.8%
SCR	9.78	12.07	12.89	-	-	+1.3%	+0.8	+ 6.8%
SPR	27.41	35.54	34.42	6.48	27.94	+1.6%	-1.1	-3.2%
CPR	26.29	33.42	32.06	3.19	28.87	+1.5%	-1.4	-4.1%
EPR	12.80	18.68	21.23	2.51	18.72	+2.6%	+2.6	+13.7%
All USSR	104.06	135.60	131.55			+1.8%	-4.0	-3.0%
USSR-SCR	94.28	123.53	118.65	17.54	100.81	+1.8%	-4.9	-4.0%

Source: Trudy TsSU, Tom VIII, vyp.1, M.1921, pp.2-7

And later still Kondratiev compared the 1920 data with the results of the 1916 census as well as the 1897 one:

(in mlns.)

	1897 All	1897 Urban	1897 Rural	1916 All	1916 Urban	1916 Rural	1920 All	1920 Urban	1920 Rural
NCR	21.83	4.10	17.73	28.16	7.81	20.35	23.93	3.71	20.72
SCR									
SPR	28.18	3.73	24.65	38.07	7.34	30.73	36.53	4.86	29.67
CPR	27.95	2.49	25.47	35.28	4.42	30.86	34.22	2.55	31.66
EPR	14.91	0.98	13.93	22.76	2.04	20.72	22.93	1.76	21.17
All USSR - SCR	92.87	11.31	81.56	124.26	21.61	102.65	115.60	12.88	102.72

Source: N.D.Kondratiev (ed.) Sel.Khoz Rossii v XX veke, M.1923, pp.28-9.

Note: These figures exclude the army (about 7 million) but include about 5-6 million refugees.

The Kondratiev figures are very difficult to interpet because the 1916 figures exclude the army of about 7 million but include about 5-6 million refugees and displaced persons. As explained above[1] this gave a much larger than normal share of the population to the NCR and urban areas. Nevertheless the decline of the urban population in the NCR was most dramatic in the Civil War years and the NCR is the only region to register a lower urban population in 1920 than in 1897.

Turning now to the TsSU figures for 1897, 1914 and 1920 we see the sharp change in population dynamics brought about by the War. The annual average growth rate of 1.8% per year stopped and during the next 4 years there was an absolute decline in the population by 4 million. The decline was the most serious in the NCR, an absolute decline of 17.8%, followed by the CPR (an absolute decline of 4.1%) and the SPR (an absolute decline of 3.2%). The SCR and EPR indicate a continued growth of population (respectively 6.8% and 13.7%). But if we compare the actual 1920 population levels with the hypothetical 1920 level (assuming a continuation of the 1897-1914 growth rates)[2], then we see a hypothetical shortfall in the population in all regions and an overall shortfall of 18.7 million (12.4%).

(in mlns.)	Actual 1920	Hypothetical 1920	Hypothetical Shortfall in mln.	Shortfall in %
NCR	30.65	38.31	7.7	20.1%
SCR	12.89	13.01	0.1	0.9%
SPR	34.42	38.95	4.5	11.6%
CPR	37.06	36.43	4.4	12.0%
EPR	21.23	21.56	0.4	1.7%
USSR	131.55	150.24	18.7	17.4%

1. See pp. 81-3.

2. This is a little inaccurate as there were already signs of a decrease in growth rate in the years preceeding the First World War. (See above p. 80-1).

As we shall see below this was probably a very large over-estimation of the extent of the wartime losses.

For the years after the census there were little reliable data upon which to estimate changes in the size of population. The former church registration system had been abolished and its functions transferred to special departments (ZAGS, Zapiski aktov grazhdanskogo sostoyaniya). These departments were administered by the NKYust through the local courts until 1921 and then by the local soviets with a central ZAGS department under the NKVD[1]. The data collected by ZAGS in these early years were very incomplete and inaccurate. For these early years, before 1923 TsSU appears to have relied upon its sample surveys and its dynamic surveys in order to provide an indication of the changing number of peasant households and the changing size of the average household in the different regions. The rural population data given in the 1923 volume of Trudy TsSU provide a most distressing picture of population change in all regions apart from the NCR:

(in mlns.)

Region	1920	1921	1922	% change 1922/21
NCR	21.93	21.93	22.84	+4.1%
SPR	26.74	26.74	26.33	-1.5%
CPR	32.48	32.48	31.34	-3.5%
EPR	16.57	16.57	15.23	-8.1%
All USSR less SCR	97.72	97.72	95.73	-2.0%

Source: Trudy TsSU, Tom VIII, vyp.4, M.1923, pp.398-401.

But this appears to have somewhat exaggerated the decline in these years.

There are two problems in comparing the 1923 and later data with the earlier data. First, TsSU changed the regionalisation which it

1. See A.M.Vostrikova and P.G.Podyachikh, 'Statistika naseleniya', in Istoriya Sovetskoi Gosudarstvennoi Statistiki, M.1969, p.361.

was using. This was rather confusing because they kept the same titles to the major economic areas that they were using, but made some very significant changes in the administrative regions that they included within these major economic areas. The most important change that concerns us is that until 1923 Nizhegorodskaya Gubernia was included in the Moskovsko-Promyishlennyi Raion, which appears in my classification in the NCR, while after 1923 it is transferred to the Volzhsko-Kamskii Raion which appears in my classification as part of the CPR. The data consequently have to be adjusted for comparability, if we wish to move beyond the 1923 threshold. These corrections are worked out in the appendix. The second problem lies in the adjustments which were made to the basic data at this time. The size of the rural population appears to have been inflated at this time. The total level of population as recorded in the 1920 census appears to have been accepted, but a larger proportion of it was classified as rural earlier. Although the effect of this adjustment was to reduce the size of the 1920 urban population by over 6%, it could make little difference to the absolute size of the rural population (it probably inflated it by just over 1%). But of far more importance than this 1% change in level of the rural population was an adjustment which appears to have been made to the rural growth rates in these years.

In the following table I have adjusted the 1923 rural population figures to make them comparable with the 1922 figures. But when they are compared with the 1922 figures they indicate an impossibly high growth rate for 1923:

(in mlns.)

Region	1921	1922	1923	% change 1923/22
NCR	21.93	22.84	25.05	+9.7%
SPR	26.74	26.33	30.36	+15.3%
CPR	32.48	31.34	32.59	+4.0%
EPR	16.57	15.23	15.33	+0.6%
USSR less SCR	97.72	95.73	103.33	+7.9%

Sources: Trudy TsSU, Tom VIII, vyp.4, M.1923, pp.398-401 and Trudy TsSU, Tom VIII, vyp.5, M.1924, pp.143-5 (See Appendix for adjustments to classifications).

Since the urban population was growing rapidly at this time, the 8% growth in rural population in one year cannot be explained in terms of de-urbanisation. It is also far too high a figure to be explained in terms of immigration. The maximum feasible rural growth rate is about 2½% per year. As explained above, about 1.5% could be due to a re-classification of the 1920 urban and rural population. But that still requires an explanation for about 4% of this apparent growth.

The simplest explanation is that there had been a higher growth of rural population in earlier years than that reported in the 1923 volume of Trudy TsSU. Instead of having a stable rural population between 1920 and 1921 and then a 2% decline from 1921 to 1922, we would just require a 2% growth to be spread over the two years 1920-1 and 1921-22, i.e. about 1% growth per year. This would already represent quite a slow down in comparison with pre-war population growth rates.

The more reliable data for 1923 were a result of the 1923 census of urban population and improved registration practice in the rural areas. The slightly revised 1920 census data and the results of the 1923 population estimates are analysed in the table below, after conversion into comparable regionalisations:

The population changes between the 1920 and 1923 censuses, in mlns.

Region	All population			Rural population			Urban population		
	1920	1923	annual average growth	1920	1923	annual average growth	1920	1923	annual average growth
NCR	27.67	29.59	+2.8%	22.66	23.11	+0.8%	5.01	6.47	+11.7%
SPR	33.50	33.69	+0.2%	27.93	27.59	-0.5%	5.57	6.10	+3.8%
CPR	35.44	35.52	+0.1%	31.87	32.03	+0.2%	3.66	3.49	-1.9%
EPR	19.30	19.75	+0.9%	16.75	17.25	+1.2%	2.56	2.50	-0.9%
USSR less SCR	115.95	118.54	+0.9%	99.22	99.98	+0.3%	16.79	18.56	+4.2%

Source: Computed from Trudy TsSU, Tom VIII, vyp.7, M.1926, pp.2-7, Trudy TsSU, Tom VIII, vyp. M.1921, pp.2-4, and Trudy TsSU Tom XVIII, M.1924, pp.2-4. See appendix.

Note: No readily available official comparison of the 1920 and 1923 censuses appears to have been made. The regionalisation used by TsSU was changed at this time and consequently these figures have had to be reaggregated from gubernia totals (See appendix).

The 1920 census was carried out on August 28, 1920 and the 1923 census on March 15, 1923. The period between these censuses was consequently about two and a half years.

This table indicates that there was a slight growth in overall level of population in all regions over the two and a half years between the 1920 census and the 1923 urban census. The growth rate was largest in the NCR, where it was almost twice the pre-war average growth rate, and it was lowest in the CPR and SPR. The NCR and SPR appear to have very high urban growth rates over this period but there appears to have been a decline in the urban populations in the CPR and EPR. The growth rates of the rural population appear more moderate apart from the decline in the SPR. Again we see that the demographic effect of the famine appears far less significant from these figures than it does from the figures in the 1923 volume of Trudy TsSU.

The first detailed balance of the national economy which was drawn

up in TsSU in the mid-1920s covered the year 1923/24. It is of great significance to us, because of the detailed grain forage balance that it contains. However, the population data used in this balance to calculate personal consumption levels are not easily comparable with the other population data that I have so far mentioned. The population data in the 1923/24 balance (and as we shall see later, in the 1928-30 balances) were classified according to nature of the primary employment of the heads of the households into which the population was divided. The major classification is thus between agricultural and non-agricultural populations, and not between urban and rural populations. The population figures from this source are given below:

(in mlns.)

	All Popln.	Agricultural Population	Non-Agricultural Population	% of Non-Agricultural Population to all Popln
NCR	31.39	23.82	7.56	24.1%
SCR	10.61	8.71	1.90	17.9%
SPR	35.27	28.15	7.12	20.2%
CPR	42.67	37.36	5.31	17.4%
EPR	14.20	12.36	1.84	12.9%
All USSR	134.13	110.40	23.73	17.7%

Source: Trudy TsSU, Tom XXIX, M.1926, p. 126.

In many respects the pattern of population distribution according to employment is similar to the pattern according to urbanisation. This is due to the obvious fact that most non-agricultural professions are concentrated in urban areas. But nevertheless there is a significant proportion of the rural population which is non-agricultural by profession. I will return to these figures when I review the population data from the later 1928-30 balances of the national economy.

In the volume of Trudy TsSU which was published on the eve of the 1926 census, there was a fairly detailed comparison of the population as estimated in 1925 and the population in 1920 according to the 1920 census, but with the urban/rural revision already mentioned. These figures indicated the continued rapid growth of the population in the NCR and the slower rates in the CPR and EPR:

(in millions)

	All population			Urban population			Rural population		
Region	1920	1925	annual average growth	1920	1925	annual average growth	1920	1925	annual average growth
NCR	31.71	36.63	+3.1%	5.23	7.61	+9.1%	26.39	29.03	+2.0%
SCR	10.90	11.14	+0.4%	1.98	2.00	+0.2%	8.92	9.14	+0.5%
SPR	33.91	36.94	+1.8%	5.62	5.56	-0.2%	28.91	31.38	+1.7%
CPR	31.42	31.64	+1.4%	3.36	3.50	+0.8%	28.16	28.14	0
EPR	23.69	23.52	-0.1%	3.21	3.26	+0.3%	20.44	20.27	-0.2%
USSR	131.61	139.87	+1.3%	19.39	21.72	+2.4%	112.20	117.97	+1.0%

Source: See Trudy TsSU, Tom VIII, vyp.7, M.1926, pp.2-7

However, it should be realised that the NCR at this time had only just regained the level of population that it had before the War. The following table of indices with the 1914 population given as 100 indicates the extent of population recovery:

	1914	1920	1923	1925
NCR	100	87.2	93.3	100.7
SCR	100	106.9		109.1
SPR	100	96.8	97.3	105.5
CPR	100	95.9	96.1	96.6
EPR	100	145.9	149.3	144.9
USSR	100	97.0	99.2	103.1

Sources: See tables given above.

A major improvement in the quality of population data came with the carrying out of the census in December 1926. In the preliminary results to the census TsSU compared the census results with the population estimates that it had made for 1/1/1926 and 1/1/1927, and which had been used in the drawing up of the operational grain forage balances for those years. This comparison is given in the table below:

(in mlns.)

	TsSU Estimate 1/1/1926			TsSU Estimate 1/1/1927			Census 17/12/1926		
	Urban	Rural	All	Urban	Rural	All	Urban	Rural	All
NCR	7.95	29.47	37.43	8.72	30.01	38.72	8.62	28.75	37.35
SCR	2.27	8.78	11.04	2.34	8.94	11.29	2.64	9.60	12.23
SPR	7.03	30.61	37.63	7.30	31.40	38.69	7.30	31.37	38.67
CPR	3.53	29.63	33.15	3.64	30.03	33.67	3.60	29.07	32.66
EPR	3.17	19.46	22.63	3.28	19.80	23.09	3.57	20.82	24.39
USSR	23.94	117.94	141.89	24.78	120.18	144.96	25.72	119.60	145.31

Source: Vsesoyuznaya perepis naseleniya 17 Dekabrya 1926 goda, predvaritelniye itogi, vyp.1, M.1927, pp.37-40 and vyp.3, M.1927, pp.16-7.

These figures indicate that TsSU had been over-estimating the size of the rural population in the NCR by well over 1 million and had been under-estimating the urban population in the NCR by about 0.4 million. It had under-estimated the population in the SCR by about a million. It had been remarkably accurate in its estimation of the Ukrainian population[1]. The rural population of the CPR had been over-estimated by about a million, indicating that the 1923 correction which had diminished the apparent demographic significance of the famine had probably over-compensated. And finally the population of the EPR had been under-estimate

1. The Ukrainians were particularly strong on demography. The Ukrainian Academy of Sciences had set up the first Soviet Institute of demography under Academician Ptukha in the early 1920s.

by about 1.2 million, most of which were the rural population. The overall estimation for the whole of the USSR was only about 0.3 million low. But this covered quite significant regional and urban/rural discrepancies.

The estimates made after the appearance of the census should all be based on a far more firm statistical basis than the earlier estimates. But very few series of regional data are available which go back into the early 1920s. One such series appeared in the 1930 edition of the results of TsSU's autumn investigations for 1923-27 in comparison with 1916. The regional summaries from this series are presented in the table below; they refer to the number of peasants registered in peasant households:

(in mlns.)

	1916	1923	1924	1925	1926	1927	Annual growth in % 1924/23	1925/24	1926/25	1927/26
NCR	27.56	29.14	29.61	30.07	30.60	31.01	+1.6	+1.6	+1.8	+1.6
SCR	10.39	8.94	9.12	9.39	9.75	9.90	+2.0	+3.0	+3.8	+1.5
SPR	29.29	30.21	30.28	31.10	31.96	32.66	+0.2	+2.7	+2.8	+2.2
CPR	31.11	28.78	29.56	29.78	30.39	31.39	+2.7	+0.7	+2.0	+3.3
EPR	20.54	19.79	20.76	21.19	21.60	22.36	+4.9	+2.1	+1.9	+3.5
USSR	119.16	117.11	119.53	121.79	124.59	127.58	+2.1	+1.9	+2.3	+2.4

Source: A.I.Gayster (ed.), Osnovniye elementy Sel.Khoz.proizvodstva SSSR, 1916 i 1923-7 gg., M.1930, pp.2-5.

There are problems involved in using these figures because they refer to the registered and not to the actual 'on hand' population. This is particularly serious for the 1916 figures which include about 6 million peasants who were at the time serving in the tsarist army and about 1 million otkhodniki. The fluctuating growth rates and the accelerating overall growth rate in the mid-1920s are probably somewhat dubious. These data will be of use to us because there are some useful sown area and livestock series of data which are given in the same regionalisations, but

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(in mlns)

	1916	1923	1924	1925	1926	1927	Annual growth in % 1924/23	1925/24	1926/25	1927/26
NCR	27.56	29.14	29.61	30.07	30.60	31.01	+1.6	+1.6	+1.8	+1.6
SCR	10.39	8.94	9.12	9.39	9.75	9.90	+2.0	+3.0	+3.8	+1.5
SPR	29.29	30.21	30.28	31.10	31.96	32.66	+0.2	+2.7	+2.8	+2.2
CPR	31.11	28.78	29.56	29.78	30.39	31.39	+2.7	+0.7	+2.0	+3.3
EPR	20.54	19.79	20.76	21.19	21.60	22.36	+4.9	+2.1	+1.9	+3.5
USSR	119.16	117.11	119.53	121.79	124.59	127.58	+2.1	+1.9	+2.3	+2.4

Source: A.I.Gayster (ed.) Osnovniye elementy Sel.Khoz.proizvodstva SSSR, 1916 i 1923-7 gg., M.1930, pp.2-5.

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in general they must be treated with great caution and not too much faith should be placed in their dynamic.

The final 1920s regional population data that I am going to consider are the series of data used in the Expert Soviet's grain forage balances for the late 1920s. I have already mentioned the earliest figures used in these balances before the appearance of the 1926 census results. The series that I am going to consider now was constructed after the appearance of the census results and so should be more reliable. These data are presented in the following table:

	1925/26			1926/27			1927/28		
	all	urban	rural	all	urban	rural	all	urban	rural
NCR	36.70	8.15	28.55	37.43	8.69	28.77	38.21	4.27	28.94
SCR	11.62	2.45	9.17	11.90	2.57	9.34	12.24	2.69	9.55
SPR	37.83	6.86	30.97	38.70	7.30	31.34	39.58	7.74	31.84
CPR	32.00	3.49	28.52	32.66	3.59	29.07	33.33	3.71	29.63
EPR	25.02	3.53	21.49	25.70	3.71	21.99	26.39	3.90	22.49
USSR	143.17	24.47	118.71	146.39	25.86	120.53	149.72	27.33	122.39

Source: Predpolozhitelnyi khlebo-furazhnyi balans na 1927/28 sel.khoz.god., M.1927, pp.28-31

All the available series of population data have been combined into a single series which is presented below:

Regional population data, A combined series

(in mlns.)

	NCR	SCR	SPR	CPR	EPR	USSR
1897						
1914	35.72	10.40	34.86	32.45	21.59	135.02
1916						
1920	31.15	11.11	33.95	31.13	24.54	131.88
21	(31.2)	(11.11)	(34.5)	(31.2)	(24.5)	(132.5)
22	(31.2)	(11.11)	(35.0)	(31.2)	(24.5)	(133.0)
23	(32.5)	(11.2)	(35.6)	(31.2)	(24.5)	(135.0)
24	(33.9)	(11.3)	(36.3)	(31.3)	(24.6)	(137.4)
1925	(35.3)	11.35	(37.0)	(31.5)	(24.7)	139.85
26	36.70	11.62	37.83	32.00	25.2	143.17
27	37.43	11.10	38.70	32.66	25.70	146.39
28	38.71	12.24	39.58	33.33	26.39	149.72
29	(39.0)	(12.61)	(40.4)	(33.9)	(26.92)	(152.83)
1930	(39.8)	(12.98)	(41.0)	(34.0)	(27.15)	(155.23)

Regional rates of urbanisation. A combined series (in %%)

	NCR	SCR	SPR	CPR	EPR	USSR
1897	18.78		13.24	8.91	6.57	12.18
1914	15.43			8.07		
1916	27.73		19.28	12.53	8.96	17.39
1920	16.50	18.15	16.57	10.68	13.56	14.73
21	(16.5)	(18.1)	(16.0)	(10.6)	(13.6)	(14.7)
22	(17.5)	(18.1)	(15.0)	(10.6)	(13.6)	(14.8)
23	(18.6)	(18.1)	(15.0)	(10.8)	(13.7)	(15.0)
24	(19.7)	(18.0)	(15.0)	(10.9)	(13.8)	(15.2)
1925	20.76	17.96	15.05	11.06	13.88	15.53
26	22.20	21.07	18.13	10.9	14.10	17.09
27	23.21	21.55	18.87	11.00	14.43	17.66
28	24.26	21.95	19.56	11.12	14.77	18.25
29	(25.59)	(22.0)	(20.0)	(11.67)	(16.04)	(18.6)
1930	(26.92	(22.2)	(20.47)	(12.11)	(17.32)	(19.0)

ii) Data on grain consumption norms

The 1920s in the Soviet Union were a golden age for the collection and processing of data on personal food consumption. This question had never before been investigated on such a wide scale and with such an organised expenditure of effort. But the size of the effort and the impressive look of the detailed volumes of results should not lead us into assuming that they automatically resulted in a high quality of results. Although the effort was immense, the task also was immense, and it had been made no easier by the experience of the War and requisitioning. The peasantry were still largely illiterate and were highly distrustful of all officials. The statisticians had to work in a vast, hostile country, but this does not appear to have dampened their enthusiasm.

In November 1918, a special department of food consumption and distribution statistics was set up within TsSU, to organise a system of food consumption studies on a mass scale. From its inception A.E. Lositsky was invited to head it[1]. The department soon realised that if it was to get a regular up to date indication of food consumption throughout the country it would have to carry out its own food consumption investigations, independent of the general series of budget studies. The department therefore needed to have its own network of statisticians in GSB and the major town SBs who would be able to conduct and organise a series of investigations in their own area.

By February 1919, Lositsky's department was already carrying out its first major investigations. In March and April of its first year of operations (1919) it carried out investigations of 6,839 worker households

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1. After the dispersal of his statistics department in the Provisional Government's Ministry of Food, Lositsky appears to have worked on organising consumption surveys for one of the Moscow Cooperatives (See Trudy TsSU, Tom XXX,vyp.2, M.1928, p.15). The fact that Popov and the collegium of TsSU invited the head of one of the most important former statistical offices to head the new department of consumption and distribution statistics indicates how important they considered this department to be.

and 6,635 employee households in the six largest towns and the 30 major administrative centres of the RSFSR. The surveying of rural households began in the following year when 4,300 peasant households were covered, over half of which were located in the NCR. During these first two years the department was only finding its way, but by 1920/21 it was surveying about 15,000 peasant households and over 6,000 urban households twice a year. At its peak in 1924/25 the department carried out over 93,000 consumption investigations (investigating a sample of about 30,000 households three times in one year). The number and distribution of these investigations down to the autumn of 1927/28 are listed in the appendix. In 1927/28 the last date we have accurate data for, over 23,900 surveys were being carried out of peasant households and almost 30,800 surveys of urban households. After this date it was decided, on the grounds of economy, to abandon these separate food surveys and to rely more upon the budget studies. This change did of course coincide with the beginning of the 1927/28 procurements crisis and therefore with the expected appearance of unfavourable food consumption indicators.

Other sources of data on food consumption were available throughout this period and some of these continued to be available some time after the disappearance of the specialised food consumption investigations. The most important other source was the series of budget investigations. The budget investigations have already been mentioned above in connection with their providing control data on grain production; they are described in more detail in an appendix[1].

These budget investigations were of particular importance in providing an indication of food consumption norms in 1918/19, when Lenin himself had first begun to show an interest in this problem[2], and before Lositsky's department had got its peasant household investigations organised.

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1. See appendix, pp.305-9.
2. See later p.596.

Throughout this period these budget studies provided a check on Lositsky's food investigations, and the full year round budget records (zapisi) provided, in theory, a means of converting the results of a few months investigations into a seasonal pattern, before calculating the overall annual average[1].

There were, however, three major drawbacks with using these budget data. First, there was a problem with the different periodisations used. The budgets were timed for the middle of the economic year in April, while the food investigations were timed for the end of the agricultural year in July.

In order to make the correct comparison it is necessary to regroup the results of the budget studies for the appropriate months. The second problem lies in the length of time required to process the results of these budget studies. The delay in the processing of the results of the budget studies was, in fact, so great that they could not be used for urgent conjunctural tasks. As late as 1928 Lositsky was claiming that most of the food consumption data in the earlier budget balances had not yet been worked out and was not likely to be worked out in the near future[2]. The scale of the organisation of the budget investigations had clearly far outrun TsSU's resources in processing and analysing the data.

Thirdly, these budgets were extremely expensive. It was because of these problems that only about half the available expeditionary budgets were ever used for control purposes and only a few of the available budget records. The creation of a more streamlined series of balance expeditionary budgets in 1926/27 and 1927/28 and of product record budgets in 1927/28 and

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1. According to Lositsky's account of the work of his department in SO, 1927, no.8, pp.12 16 and in Khlebnyi Ryinok, 1924, No.4-5, p23, it was the intention to use the budget records for this purpose. But in the more detailed volume of the results of his investigations, it is clear that Lositsky is assuming a fairly stable seasonal pattern of grain consumption and that he calculates his annual average figure as the simple average of the available monthly data. (See Trudy TsSU, Tom XXX, vyp.2, M.1928, pp.25-34).

2. See A.E.Lositsky in Trudy TsSU, Tom XXX, vyp.2, M.1928, p.16.

1928/29 would have undoubtedly improved the usefulness and cost effectiveness of these budgets and consequently would have, to some extent, justified some of the economies which were being made at this time in the scale of food consumption investigations.

Apart from these major sources of data, other budget investigations had been carried out in the industrial centres by the Central Bureau of Labour Statistics which was attached jointly to TsSU, VTsSPS and NKTrud. This bureau was headed by S.G.Strumilin and it contained E.O.Kabo as head of the department of workers' budgets[1]. This bureau had been carrying out budget investigations since May 1918 in Petrograd and since October/November 1918 in Moscow. By the early 1920s it was carrying out several thousand budgets in the major industrial centres:

Date	Number of investigations
December 1922	1652
November 1923	3628
Nov./Dec.1924	3695
November 1925	3676
November 1926	3618

Source: See Trudy TsSU, Tom XXX, vyp.2, M.1928, p.16.

The scale of all these surveys, like much of the Soviet statistical work of the time was, and remains, unparalleled. In their size of samples and methodology they appear in a favourable light in comparison with the most elaborate food surveys which have been carried out anywhere.

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1. I have not been able to ascertain whether E.O.Kabo was the same person as R.Kabo. She certainly seemed to have very similar interests as she wrote a book on the Russian workers' food before and after the War. (E.O.Kabo, Pitaniye Russkogo Rabochego do i posle voiny, M.1926). But there is no mention of her earlier work in her obituary. (See Sovetskaya Statistika za polveka, 1917-1967 gg., M.1970, pp.272-8).

In Britain the largest and most detailed food consumption survey that there has ever been was the sample survey of urban working class household diet from 1940-49[1]. This British survey was based on a sample of from 4795 to 9141 households a year with an average number of 7138. The British survey sample consequently covered about 0.1% of the urban working class. This was approximately the same coverage that Lositsky's food consumption surveys achieved for the entire peasantry but only 1/5 of that achieved by Lositsky for the urban population. It was also just slightly more than Litoshenko's budget investigations had achieved for their coverage of the peasantry.

The British had only one system of investigation. The surveys lasted for only one week's duration. They were carried out only once a year, and relied upon the householder's voluntarily filling in a questionnaire. The Soviets had several systems of investigation, which were able to act as a control on each other. Of these major systems Lositsky's food surveys were carried out over a two-week period and were repeated at least twice a year and in 1924/25 three times a year. Lositsky's department had apparently experimented with using voluntary questionnaires but this system had been abandoned as unreliable[2]. Instead the Soviet investigators themselves questioned the urban householders, after explaining the purpose of the investigation and went through the forms with them. The investigators got the householders to keep a record of their current consumption over a week and then when visited in the second week the householders were asked to report on their consumption

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1. See The Urban Working-Class Household Diet 1940 to 1949: First Report of the National Food Survey Committee, Ministry of Food, London, 1951.

2. See Lositsky's account of the early stages of the work of his department in V.S. 1922, no.5-8. See also Kabo's account of distortions from subjective evaluations (above p.115). Of course this does not mean to say that this method would also be unreliable in the British context where the social and cultural circumstances would be very different.

over the previous week and to make an estimate of their consumption over the last month[1]. The system in rural areas was of necessity less rigorous. In the rural areas forms were distributed to the local voluntary correspondents and to the local (volost or raion) statisticians. The local correspondents were asked to fill in the forms for their own household's consumption and for one or two of their neighbours. The local statisticians were similarly asked to find some reliable householders to question. The procedure was then similar to that for urban areas. The householders were asked to keep a current record for a week and then to make an estimate of consumption for a month[2].

The budget studies data, as explained in the appendix,were of several kinds. Some of the studies, covering about 2,000 households in the late 1920s, used questionnaires to keep current records (tekushchiye budzhetniye zapisi) continuously throughout the year. These were intended to be used to check the seasonal variability of food consumption[3]. Other budget studies, up to about 10,000, were collected by expeditionary means by sending out investigators from the USB who selected and surveyed in all aspects of a given household throughout the year. These full expeditionary investigations were supposed to be the most reliable because they covered all aspects of the peasant household, they made it relatively more difficult for the peasants to provide false or misleading replies. But they were very expensive. And as already mentioned much of the data they contained were consequently never worked out. It was mainly because of the expense of these full budgets that other,cheaper, budget studies, the so-called

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1. See 'Sostoyaniye pitaniya gorodskogo naseleniya SSSR 1919-1924gg.', Trudy TsSU, Tom XXX,vyp.1, M.1926, p.3, (and see ibid., pp.267-9 for a copy of the form filled in).
2. See 'Sostoyaniye pitaniya Selskogo naseleniya SSSR 1920-24 gg.', Trudy TsSU, Tom XXX, vyp.2, M.1928, pp.17-22, (and pp.169-72 for a copy of the forms used for the rural areas.
3. See A.E.Lositsky, SO ,1927, no.8, p.13, and in Ezhegodnik Khlebnoi Torgovli, no.1, M.1928.

short budgets were introduced after 1923/24. The relative reliability of the consumption data from the different kinds of budget are unknown. And we also have no knowledge of which kind of budget data was compared with the food consumption data. There is however at least one indication that the standard of investigation from some of these budget studies was not as high as it was claimed to be. In 1928, Lositsky cast considerable doubt on the reliability of the budget studies when he stated that in many of them the level of food consumption was simply derived as a residual when attempts had been made at asessing all other elements[1].

All these investigations were also likely to suffer from the perennial problem of the over-representation of the more literate and therefore more wealthy peasant households. These could be expected to have a higher than average consumption norm and therefore some form of adjustment would need to be made for this bias in the sample. Such an adjustment was made by grouping the data according to the area sown by the household and then weighting each group to bring the share of each group down to the national or regional average. The results for the different sowing groups unadjusted, the unadjusted national average and the adjusted national average from the food investigation studies for 1925/26 are given in the table below:

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1. See A.E.Lositsky, Trudy TsSU, Tom XXX, vyp.2, M.1928, p.30. Unfortunately, Lositsky failed to distinguish just which kind of budget study he was referring to. But it would appear to be neither the full detailed budget nor the later more specialised balance budget and so was in all probability the cheaper short budget.

Groups of households according to sown area	Standard Food Investigation	Adjusted for comparable regions: Standard Food Investigation
No sowings	0.219	0.212
0-2 Desyatiny	0.228	0.227
2-4 Desyatiny	0.239	0.239
4-6 Desyatiny	0.251	0.251
6-8 Desyatiny	0.259	0.260
8-10 Desyatiny	0.269	0.268
10-16 Desyatiny	0.260	0.261
16+ Desyatiny	0.272	0.272
All unweighted	0.245	0.240
All weighted for sown area	0.247	0.240

Source: A.E.Lositsky, Normy potrebleniya khlebnyikh produktov v SSSR, Statisticheskoye Obozreniye, No.8, 1927, p.13.

It is interesting to note that in the British survey an attempt was made to adjust the sample for untypical levels of household income. But it apparently proved impossible to gain reliable information on the level of British wartime incomes and so attemots to adjust the British data had to be abandoned[1].

Apart from the adjustments to correct for the untypical sown area, other adjustments were made to correct for other untypical features of the sample such as the number of grownups in the surveyed households, the number of people living alone and the involvement in industrial activities[2].

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1. The Urban Working-Class Household Diet 1940-1949, Ministry of Food, London 1951, p.1.
2. See Trudy TsSU, Tom XXX, vyp.2, M.1928, pp.34-39.

A comparison of the results from these different investigations as presented by Lositsky is given in the table below:

(in tons per head per years)		Food Investigations (a)	Exped. budgets (b)	Budget records (c)	%% a/b	%% a/c
1920/21	(i)	0.169	0.156		108.3%	
1921/22						
1922/23	(i)	0.260	0,228		114.0%	
	(iii)	0.265	0.233		113.7%	
1923/24	(i)	0.250	0.213		117.4%	
	(iii)	0.251	0.212		118.4%	
1924/25	(i)	0.248	0.213		116.4%	
	(iii)	0.247	0,212		116.5%	
1925/26	(i)	0.245	0,232	0,257	105.6%	95.3%
	(ii)	0.240	0.226	0.244	106.2%	98.4%
	(iii)	0.247	0.231	0.255	106.9%	96.9%

Sources: Trudy TsSU, Tom XXX, vyp.2, M.1928, pp.24-31, for all figures apart from 1925/26 (ii) which comes from A.E.Lositsky, S O ,1927, no.8, p.13.

Notes: (i) refers to unadjusted data,
(ii) refers to data with adjustments for sown area made in 1927,
(iii) refers to data with adjustments for sown area made in 1928.

Further Notes:

1923/24-1925/26 were clearly specified as being in flour equivalents, 1922/23 was clearly specified as being in grain equivalents. 1920/21 was not clearly defined.

The 1922/23 food investigation data are the average of the figures for February and October 1922 and for February 1923.

These comparisons have to be treated with the greatest of care. The 1922/23 figures and probably the 1920/21 figures are given in grain equivalents and are consequently between 10 and 20% higher than the other figures which are given in flour equivalents. The 1922/23 food investigation figures have also been selected to include a 33% weighting of a figure which really belongs to the 1921/22 agricultural year, (i.e. February 1922).

This has been done to make the results more compatible with the results of the 1922/23 budget investigations, which covered the year (April-March, and not the agricultural year (July-June). Since only 3 months of the 1921/22 agricultural year are included in the 1922/23 April-March year, the February 1922 value should be given at most a 25% weighting and perhaps less[1]; the 1923 food investigation figure would rise to (i) 235 and (ii) 239[2] which would be at least 3.2 or 2.7% above the expeditionary budget figure.

Apart from this, the results for the early years were based on a very small number of comparisons. In 1920/21 these comparisons were based on just 379 budget studies and 3833 food investigation studies and the figures given in the table as coming from the 1920/21 food investigation survey are about 20% lower than all other reports of the results of this survey[3].

It would therefore appear that the two figures in the above table which give the most striking confirmation of the reliability of the food consumption studies are extremely dubious and if handled with sufficient critical attention, might well indicate that the food consumption studies gave values significantly higher than those from the budget data.

For the later years the results of the food investigation studies indicate a level of grain consumption which varies between 16-18% higher than the level indicated in the expeditionary budgets in 1923/24 and 1924/25, 5-7% higher in 1925/26. These results are very difficult to interpret, but they are clearly not a consequence of the difference in the coverage of larger households. The sown area adjust-nt

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1. As the prospects of the good harvest of 1922 approached we would expect there to be a slight increase in the availability of grain as speculators off-loaded their grain stocks.
2. $(161 \times 0.25) + \left((256+265) \times 0.75 \times 0.5\right) = 235$, $(162 \times 0.25) + \left((263+267) \times 0.75 \times 0.5\right) = 239$. (See Trudy TsSU, Tom XXX, vyp.2, M.1928, p.25).
3. Most sources give a figure of 0.210 tons per head for all [illegible] consumption from this study (see later).

in the above table indicate that the households covered by the expeditionary budget surveys contained a larger number of households sowing above average areas than did the households covered by the food investigation surveys. In such circumstances adjusting for untypical levels of sowing would result in an increase in the difference between these two sources and not a decrease. The explanation of the differences between these two sources must therefore lie in the difference in the method of collecting the consumption data from the peasants.

I would suggest that we have here, basically, the same difference between objective evaluations and subjective valuations that was noted by Kabo in her 1918 study of urban consumption[1]. I have suggested above that the food investigation surveys were open to considerable subjective manipulation, which could easily have given them values 16-18% higher than a more objective evaluation of the level. Why this difference should drop to 5-7% in 1925/26 is unfortunately not explained, but may well be a consequence of a switch to a comparison with a less objective, cheaper form of budget investigation.

Apparently, in making their overall evaluation of the reliability of the food investigation data, the TsSU Expert Soviet based itself exclusively on the 1925/26 comparisons, accepted the absolute reliability of the expeditionary budgets and therefore proposed a 5% deduction to the food investigation data. Lositsky disagreed with this on the grounds that the expeditionary budgets were not all that reliable and argued for a slightly smaller level of deflation to the basic food investigation data[2]. But if we were to take as our basis of comparison, not the 1925/26 data but the 1923/24 or 1924/25 data, then a much larger (16-18%) deflation would be necessary. Unfortunately no comparable data for years later than 1925/26 have been published, and so we just do not know what level

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1. See above p 115

2. See A.E.Lositsky, Trudy TsSU, Tom XXX, vyp.2, M.1928, p.30.

of correction should be applied for these years.

In my account of the data given above I have suggested that the differences in the comparability between the food investigation data and the budget data were more likely to be due to the changes in the different kinds of budget study that were carried out than due to differences in the reliability of the food investigation data over time. I consequently think that the food investigation data do give a fairly reliable indication of the changes in the level of grain consumption over time but not necessarily of their absolute level.

If we turn now to an analysis of the results of these investigations we can see a major difference in the level of consumption norms, between the budget studies data and the food consumption studies data. Let us look first at the budget studies.

The only available comparable data are those covering the years 1922/23-1925/26. The 1922/23 data were originally given in grain equivalents but have been deflated here into flour equivalents, using the regional extraction rates for 1922/23 calculated from the food investigation studies. All these data are presented below with a regional breakdown:

(kg. per cap. per annum)

	1922/23	1923/24	1924/25	1925/26
NCR	205	197	194	204
SPR				
UkSSR	238	221	209	219
Sev.Kav.	221	243	228	235
CPR	204	206	210	
Ts.Ch.Zem.				208
Volga				256
EPR				
Siberia	222	251	260	245
All USSR	214	212	212	231

Sources: Trudy TsSU, Tom XXX, vyp.2, M.1928, pp.24-31.

Note: The figures for 1922/23 in flour equivalents have been calculated from the grain equivalent figures and the regional extraction rates for 1922/23 calculated from the food investigation studies data.

From these data we see a level of overall grain consumption of about 212 kgms per head per year for 1922/23-1924/25, but then a sharp rise by 10% in 1925/26. This increase in consumption levels in 1925/26 occurs in all regions apart from Siberia.

If we turn now to look at the far more complete series of food consumption survey data, we see a very different picture of the dynamic of food consumption levels over this period. See following table:

Grain, personal consumption data in flour equivalent from specially organised food surveys. Consumption in kilograms per head per year.

		Rural Consumption								Urban Consumption	
		NCR	All PR	SPR Ukr.	SPR N.C.	CPR	EPR Sib	EPR Kaz	USSR	Workers	Employees
1918/19	Mar/Apr									132	144
	July									160	149
	average									146	147
1919/20	Dec.									179	173
	Jan/Feb	181				242			210		
	May									185	162
	average	181				242			210	182	167
1920/21	Oct/Nov									168	159
	Nov/Dec	176		304	270	189	284	271	206		
	Feb	177		270	246	169	236	-	194		
	Apr									147	145
	average	177							200		
1921/22	Sep										
	Oct	194		224	232	113	238	265	178		
	Feb	181		194	144	90	203	109	147		
	average								163		
1922/23	Oct	216		266	281	241	257	239	242	208	188
	Feb	224		268	278	255	253	265	250	212-	190
	average								246		
1923/24	Feb	228		271	273	251	273	274	253	208	185
	June	239		265	282	253	269	244	255		
	average								254		
1924/25	Oct	237	247						250	183	170
	Feb	224	235						242	187	166
	June	239	245						244	194	168
	average								245		
1925/26	Oct	231	232						244	194	170
	Feb	230	233						242	193	169
	average								243		
1926/27	Oct	229							(241)	186	163
	Feb	215							(238)	184	165
	average										
1927/28	Oct	223							(235)	187	163

Sources: Statisticheskii Spravochnik SSSR, M.1929, pp.400-01, 406-7 for all urban consumption and for NCR and all PR. The separate regional figures for SPR, CPR and EPR and the all USSR figures come from Trudy TsSU, Tom XXX, vyp.2, M.1928, p.67, for 1919/20-1923/24 and from Statisticheskii Spravochnik SSSR, M.1927, p.315 for 1924/25-1925/26.

From these data we see that the 1925/26 consumption levels were somewhat lower than theyhad been in 1924/25 and about 4% lower than they had been in 1923/24. The picture which emerges from these data is diametrically opposed to the one that emerges from the budget studies data.

In order to ascertain which of these pictures is the most believable it is useful to consider the conjunctural picture of the grain market for these years. All sources of grain production data agree that 1925 was a good harvest year, and that significantly more grain was anticipated on the market than in all recent years. We know that the anticipated level of grain procurements by the state for export were not achieved, but this would indicate that even larger stocks were available in the village. Given this conjuctural position there seems to be little a priori reason for expecting a decline in consumption norms in 1925/26, and the dynamic indicated by the budget data seem to be far more likely for these years. For the earlier years 1919/20-1923/24 for the levels of urban consumption and for the years from 1925/26-1927/28 the relative values of the consumption studies data probably provide a fairly reliable indicator of the actual dynamic.

Let us look first at the earlier period. The studies begin in 1918/19 with the lowest recorded urban consumption rates. It is well to remember that for the urban areas as a whole these very early years had a much more strained supply position than did the later years of rural famine. In 1919/20 when the earliest rural consumption norms become available, we see a relatively normal level of consumption in the CPR and a fairly strained position in the NCR. Already by 1919/20 the urban consumption position appears better, but it must be remembered that this has been partly achieved by the dispersal of the urban population.

1920/21 indicates a severe deterioration in the food position in the CPR and a slight deterioration in the already strained NCR. But the levels of grain consumption in the SPR and EPR, which at this time had only just been liberated, were very high. Urban consumption levels appear much more strained than they had been in the previous year.

1921/22 was the year of famine conditions in the CPR with very low consumption levels. In comparison the positions in the SPR and EPR, although more strained than in 1920/21, were not particularly severe. And there was about a 10% improvement in the consumption levels in the NCR and a slightly smaller improvement in urban consumption.

1922/23 records a great improvement in the consumption levels in all areas, and especially the CPR.

If we turn now briefly to the later figures, we see after 1925/26 a gentle decline in consumption levels in both the consumer and producer rural areas and also in the urban areas. The decline continues until October 1927 which is the last date for which comparable data are available. Following the procurements crisis and the application of 'extraordinary measures' to ensure procurements in the next few months, we might well have expected to see a sharp change in consumption levels had further data been published.

For further details on this data, including a breakdown by grain and a rather dubious comparison with Klepikov's pre-war grain consumption data, see the appendix.

From 1928 we do have a few consumption norm figures available from the budget studies which continued. These consumption norms were not published at the time but were used in the calculations which Soviet statisticians made in the early 1930s of the grain forage balance and overall balance of the national economy for this period. Little is known of the manner in which budget investigations were carried out in the

later period or even of how many households were investigated. The last year for which firm figures are available is 1928/29 when over 10,000 household budgets were investigated (excluding the shorter money records)[1]

In drawing up the materials to the balance of the national economy of the USSR for 1928, 1929 and 1930 the statisticians in TsUNKhU used the peasant budgets for 1927/28, 1928/29 and 1929/30 to ascertain the level of personal grain consumption for their 1928, 1929 and 1930 grain forage balances. The results from these studies were divided into three-monthly periods and then regrouped to form calendar years. The results from the 1927/28 and 1928/29 budgets appear to have been used directly. But we are informed that the results of the 1929/30 budgets could only be partially used. Most of them were declared to be defective. Very considerable corrections had to be applied to them and they were admitted to having a very weak statistical basis (they were described as having a 'konstruktivnyi kharakter', a reconstructed character)[2].

I will now consider the grain food consumption norms that were used in the different grain forage balances in this period.

The early grain forage balances were based on very scanty and preliminary data. The first detailed accounting grain forage balance was the one for 1923/24 produced by TsSU as part of the 1923/24 balance of the national economy. This balance was published in its most complete form early in 1926[3].

This balance provides the following overall consumption norms for 1923/24:

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1. See appendix.
2. See Materialyi po balansu Nar.Khoz.SSSR za 1928,1929 i 1930gg.,M.1932 p.259.
3. P.I.Popov (ed.), 'Balans Narodnogo Khozyaistvo SSSR 1923/24g.' in Trudy TsSU, Tom XXIX, M.1926

	Agricultural Population (in tons per head per year)	Non-Agricultural Population (in tons per head per year)
grains	0.005	0.002
flour	0.198	0.169
groats	0.031	0.018
all	0.234	0.189
all in flour equivalent	0.229	0.186
all in grain equivalent	0.264	0.214

Source: Trudy TsSU, Tom XXIX, chast 2, M.1926, pp.130,144

Notes: Grains have been converted into flour equivalents and vice versa assuming a 15% extraction rate.

Note: figures refer to agricultural and non-agricultural population and not to rural and urban. However, this would make little difference at this time.

As regards the different consumption patterns in the different regions the 1923/24 balance provided the following picture:

(in tons per head per year)

	Agricultural Population			Non-Agricultural Population		
	(a)	(b)	(c)	(a)	(b)	(c)
NCR	0.218	0.246	0.213	0.169	0.191	0.166
SCR	0.229	0.257	0.223	0.179	0.201	0.175
SPR	0.260	0.293	0.255	0.189	0.215	0.201
CPR	0.247	0.278	0.242	0.204	0.231	0.201
EPR	0.204	0.230	0.177	0.238	0.271	0.236
USSR	0.234	0.264	0.229	0.189	0.214	0.186

Sources: Trudy TsSU, Tom XXIX, chast 2, M.1926, pp.130,144

Note: (a) refers to quantities as given, mainly flour equivalents.

(b) have been converted to grain equivalents using a 15% extraction rate throughout.

(c) have been converted to flour equivalents using a 15% extraction rate throughout.

The EPR regionalisation used here excludes the Urals, which appear as part of the CPR.

The standard pattern of the SPR and CPR having higher consumption rates for the agricultural population than the other regions emerges. The consumption norm in the SPR was 19% higher than in the NCR for the rural population. The non-agricultural population give a surprisingly high norm for the EPR which is probably an error.

In the appendix these norms are given in more detail with a regional by grain breakdown.

The personal consumption norms cited later in the decade by Lositsky and used by the Expert Soviet in its balances are given below in comparison with the 1923/24 figures from the early TsSU balance: (see over page)

By and large the late 1920s consumption figures seem quite comparable with the early 1920s data. If we consider the two series of figures for rural consumption in 1923/24 and realise the differences in regional coverage the figures appear very similar. Lositsky's 1927 data are 5.6% higher in the NCR, virtually identical in the SPR and CPR but much larger in the EPR. However, Lositsky's EPR data excludes Kirgizia which was the area with the lowest consumption norms, while the early 1923/24 data excluded from this region the Urals which had the highest consumption norms. If the regions were corrected the difference would therefore appear much less.

It is more difficult to compare the series of urban data. But they look fairly comparable. The data used in the Expert Soviet's balances for urban consumption appear appear to have received a slight upward correction above the values given initially by Lositsky. In most regions this was only 1 or 2%. Comparisons with the EPR are difficult because of the differences in area.

Grain personal consumption norms from Expert Soviet sources and the early TsSU norms in tons per head per year, in flour equivalents.

	Early TsSU	Lositsky and Expert Soviet data				
	1923/24	1923/24	1924/25	1925/26	1926/27	1927/28
Rural						
NCR	0.213	0.225	0.216	0.211	0.209	0.211
SCR	0.223			0.223	0.226	0.225
SPR	0.255	0.254	0.234	0.238	0.236	
				0.238*	0.232*	0.235*
CPR	0.242	0.244	0.221	0.239	0.236	0.239
EPR	0.177	0.245	0.248	0.238	0.241	
		(0.228)	(0.232)	0.220*	0.222*	0.220
USSR	0.229			0.228	0.226	0.227
USSR -SCR		0.242	0.229	0.232	0.229	
Urban						
NCR	0.166		0.174	0.174	0.168	
				0.177*	0.171*	0.171
SCR	0.175			0.195	0.194	0.192
SPR	0.187		0.163	0.168	0.161	
				0.168*	0.164*	0.164
CPR	0.201		0.187	0.193	0.186	
				0.201*	0.191*	0.191
EPR	0.236		0.187	0.179	0.173	
				0.189*	0.199*	0.191
USSR	0.186			0.181	0.178	0.177
USSR -SCR			0.177	0.179	0.179	0.173

Sources: 1923/24-1926/27 rural and 1924/25-1926/27 urban from A.E.Lositsky, SO, 1927, no.8, p.18, and A.E.Lositsky Ezhegodnik khlebnoi torgovly no.1, M.1928, p.62
1925/26-1927/28 variant marked * where figures differ from Lositsky, from Predpolozhitelnyi khlebo-furazhnyi balans SSSR na 1927/28 Sel.Khoz.god., M.1927, pp.28-30.

Early TsSU 1923/24, see above, p.522.

Note: Lositsky's data refer to the USSR less SCR and Kirgizia. The bracketed figures include Kirgizia by interpolation. All figures refer to flour equivalent.

In the following table I have calculated the average food consumption norms for these years, in flour equivalents.

(in tons per head per year)

	Rural 1923/24-1927/28		Urban 1925/26-1927/28	
	average	maximum variance	average	maximum variance
NCR	0.214	5.1%	0.175	2.3%
SCR	0.225	1.0%	0.194	-
SPR	0.239	6.3%	0.165	1.6%
CPR	0.236	6.4%	0.194	3.6%
EPR	0.221		0.193	5.0%
USSR	0.227		0.179	

The results of the later budget investigations were used to calculate the 1928, 1929 and 1930 accounting grain forage balance[1]. The grain consumption norms used in these balances were unfortunately not given with any regional differentiation at all. Their aggregate values are listed below, in comparison with the mid-1920s average consumption norms that have just been computed above:

Grain consumption in tons per head per year:

	Agricultural Population		Non-Agricultural Population	
	in flour equivalent	in grain equivalent	in flour equivalent	in grain equivalent
1923/24-1927/28	0.227	0.261	0.179	0.206
1928	0.221	0.250	0.079*	0.174
1929	0.217	0.245	0.060*	0.170

Sources: 1923/24-1927/28 figures see above, p. The grain equivalents have been calculated assuming a 15% extraction rate.
1927/28 in flour equivalents from Materialy po balansu Nar.Khoz. SSSR na 1928, 1929, 1930gg., M.1932, pp.259-61.

Note * non-agricultural consumption excludes purchases of bread.
1928 and 1929 in grain equivalents from Yu.A.Moshkov, ibid., p.136

1. See Materialyi po balansu Nar.Khoz.SSSR za 1928, 1929 i 1930gg.M.1932, pp.259-61. See also figures presented in Yu.A.Moshkov, Zernovoye problema v gody sploshnoi kollektivizatsii, M.1966, p.136.

These figures appear to be totally comparable with our figures for the earlier period and indicate the beginnings of a very serious decline in rural consumption.

c) Data on grain used as livestock feed

The organisation of this section is similar to that in section c of chapter three in part one of this thesis. It is divided into two parts: i) the available livestock data and ii) the available data on livestock feed norms.

i) Livestock data 1918-29 and in comparison with pre-revolutionary data

In order to ease the analysis of the statistical data on livestock numbers I have constructed six sets of summary tables similar in purpose to those presented in chapters two and three. Tables Horse 1 and Horse 2 present the aggregate and regional horse figures from all available statistical series. Tables Cattle 1, Cattle 2, Pigs 1 and Pigs 2, present similar summary tables for cattle and pigs. These tables are given in the following pages.

The 1916 and 1917 agricultural censuses had caused great concern, by demonstrating the poor quality of the pre-revolutionary livestock statistics. With the additional disturbances of war, revolution and civil war, the numbers of livestock became very uncertain.

The first full post-revolutionary census of livestock was carried out in 1920 as part of the 1920 agricultural census. The results of this census as regards livestock numbers were published in the Trudy TsSU in the early 1920s, in comparison with the 1916 census results. They indicated the following levels of decline:

(in mlns.)	1916	1920	%decline
Horses	31.51	25.41	-19.4%
Cattle	49.97	39.10	-21.8%
Pigs	19.59	14.83	-24.3%

Source: Trudy TsSU, Tom XVIII, M.1923, pp.136-9

The regional distribution of these declines is indicated in the following table:

Horse 1

The number of horses in the USSR from various sources in millions

Sources	1a	1b	1c	2	3a	3b	4	5	6	7	8
1916a	31.5*		31.3*	31.5*	35.8			35.8		35.8	
1916b					24.4						
1920	25.4*										
1921	23.3*							29.6			
1922	18.9*		20.2*					24.1			
1923		20.1*	20.1*	21.4*	21.9			24.6			
1924			21.9*	22.9*/23.9	24.2	24.7		25.7			
1925				24.2	26.3	26.6	26.0	27.1			
1926					28.3	28.3	28.3	29.2			
1927					30.5	30.6	30.6	31.5	31.6		
1928							32.6	33.5	33.5	33.5	
1929								34.6	34.6		

Cattle 1

The number of cattle in the USSR from various sources in millions

Sources	1a	1b	1c	2	3a	3b	4	5	6	7	8
1916a	49.97		50.3*	50.07	60.56			60.56		60.58	
1916b					58.25						
1920	39.10*										
1921	36.82*							50.8			
1922	33.03*		35.1*					45.79			
1923		38.7*	38.6*	41.27*	46.16			52.93			
1924			45.6*	47.60/51.42	53.55	56.69		59.03			
1925				49.92*	58.12	59.63	59.63	62.09			
1926					61.37	63.03	63.03	65.55			
1927					64.65	65.95	65.95	68.16	67.32		
1928							66.79	70.67	70.54	70.56	
1929								67.23	67.11		

Pigs 1

The number of pigs in the USSR from various sources in millions

Sources	1a	1b	1c	2	3a	3b	4	5	6	7	8
1916a	19.59*		19.3*	19.53*	20.88			20.88		20.88	
1916b					20.10						
1920	14.83*										
1921	12.49*							19.4			
1922	7.64*		8.6*					12.06			
1923		9.11*	9.1*	9.39*	9.76			12.86			
1924			16.8*	17.20/17.67	17.56	21.31		22.21			
1925				16.40*	17.45	20.94	20.94	21.32			
1926					16.84	20.92	20.92	21.64			
1927					18.89	22.45	22.45	23.20	23.08		
1928						25.23	25.23	26.12	25.99	25.99	
1929								20.53	20.38		

Note * refers to the USSR less SCR

Horse 2

The regional numbers of horses from different sources in millions

		NCR	SCR	SPR	CPR	EPR	USSR	USSR -SCR
1a	1916	3.96		8.83	7.12	11,60		31.51
	1920	3.69		7.15	5.12	9,45		25.41
	1921	3.75		7.01	3,92	8.65		23.33
	1922	3.92		5.17	3,26	6.54		18.88
1b	1923	4.27		4,93	4.02	6.57		20.07
2	1916	4.65		7.90	8.98	10.03		31.54
	1923	4.82		4.94	4.72	6.93		21.41
	1924	4.97	0.98	5.13	5.30	7.48	23.85	22.88
	1925	5.37		5.47	5.55	7.80		24.18
3a	1916a	5.39	0.99	8.10	8.34	12.96	35.77	
	1916b	5.16	0.97	7.31	8.00	12.91	34.35	
	1923	5.19	0.66	5.01	3,93	7.12	21.90	
	1924	5.56	0.66	5.23	4.64	8.12	24.21	
	1925	5.95	0.69	5.58	4.91	9.18	26.31	
	1926	6.08	0.79	6.18	5.50	9.73	28.27	
	1927	6.16	0.86	6.79	6.07	10.67	30.55	
3b	1924	5.70	0,66	5.25	4.67	8.38	24.67	
	1925	5.98	0.69	5.58	4.91	8.84	26.01	
	1926	6.10	0.79	6.18	5.50	9.73	28.29	
	1927	6.19	0,86	6.79	6.07	10.67	30.58	
4	1925	5.98	1.04	5.58	4.92	8.49	26.01	
	1926	6.09	1.28	6.18	5.50	9.24	28.29	
	1927	6.19	1.37	6.79	6,07	10.16	30.58	
	1928	6.28	1.39	7.32	6.46	10.53	31.98	
6	1927	6.33	1.50	6.91	6.16	10.49	31.56	
	1928	6.37	1.66	7.51	6.61	11.21	33.54	
	1929	6.34	1.79	7.78	7.07	11.49	34.64	
7	1916	5.25	1.79	8.22	8.40	12.11	35.77	
	1928	6.19	1.73	7.43	6.91	11.28	33.54	
	1916	4.68		7.92	11.38	7.33		31.31
	1922	4.57		5.22	5.55	4.83		20.17
	1923	4.74		4.91	6.09	4.32		20.06
	1924	4.97		5.06	6.97	4.92		21.92

Cattle 2

The regional numbers of cattle in millions

		NCR	SCR	SPR	CPR	EPR	USSR	USSR -SCR
1a	1916	8.37		14.45	10.24	16.91		49.97
	1920	7.44		11.96	7.18	12.52		39.10
	1921	7.90		11.74	6.43	10.75		36.82
	1922	8.59		10.31	5.99	8.14		33.03
1b	1923	7.30		10.57	9.85	9.52		38.68
2	1916	9.17		12.54	13.14	15.24		50.07
	1923	10.18		10.56	9.88	10.65		41.77
	1924		3.82	11.94	11.78	13.12	51.42	47.60
	1925	11.44		12.21	12.34	13.90		49.92
3a	1916a	10.23	6.55	12.77	12.46	18.55	60.56	
	1916b	9.82	6.46	11.62	11.92	18.43	58.25	
	1923	10.97	4.72	10.97	8.53	10.96	46.16	
	1924	11.91	4.72	12.41	10.66	13.58	53.55	
	1925	12.52	5.00	12.94	11.24	16.42	58.12	
	1926	11.80	5.34	13.69	12.22	18.32	61.37	
	1927	11.47	5.73	14.15	12.87	20.44	64.65	
3b	1924	12.50	4.72	12.82	11.57	15.07	56.69	
	1925	12.73	5.00	13.18	11.80	16.92	59.63	
	1926	12.02	5.34	13.91	12.70	19.05	63.03	
	1927	11.58	5.73	14.33	13.25	21.07	65.95	
4	1925	12.73	4.29	13.18	11.80	16.46	59.63	
	1926	12.02	4.72	13.91	12.70	18.44	63.03	
	1927	11.58	4.92	14.33	13.25	20.38	65.95	
	1928	12.27	4.87	14.53	13.79	19.76	66.79	
6	1927	11.89	7.29	13.81	13.36	20.99	67.82	
	1928	12.52	9.18	14.78	14.14	20.95	70.54	
	1929	11.91	9.34	13.14	13.94	19.65	67.11	
7	1916	10.01	6.74	13.50	12.61	16.81	60.58	
	1928	12.38	7.79	15.33	14.45	21.17	70.56	
	1916	9.34		11.99	17.67	10.38		50.28
	1922	9.68		10.40	9.37	5.60		35.05
	1923	10.04		10.50	12.08	5.99		38.60
	1924	10.76		11.78	15.13	7.96		45.64

Pigs 2

The numbers of pigs from different sources in millions

		NCR	SCR	SPR	CPR	EPR	USSR	USSR -SCR
1a	1916	3.34		7.44	3.74	5.15		19.59
	1920	2.54		6.19	2.17	3.92		14.83
	1921	2.38		5.82	1.16	3.13		12.49
	1922	2.72		3.01	0.67	1.24		7.64
1b	1923	1.24		2.96	1.00	1.59		9.13
2	1916	4.11		6.51	4.79	4.13		19.53
	1923	3.28		2.90	1.51	1.71		9.39
	1924	4.43	0.47	5.51	4.22	3.05	17.67	17.20
	1925	4.91		4.67	3.20	3.60		16.40
3a	1916a	4.60	0.50	6.70	4.38	4.70	20.88	
	1916b	4.47	0.49	6.28	4.18	4.68	20.10	
	1923	3.42	0.35	3.01	1.28	1.70	9.76	
	1924	4.95	0.35	5.57	3.58	3.12	17.56	
	1925	5.09	0.38	4.76	2.96	4.27	17.45	
	1926	4.82	0.42	4.90	2.68	4.03	16.84	
	1927	5.14	0.40	5.79	3.10	4.47	18.89	
3b	1924	6.23	0.35	6.58	4.34	3.82	21.31	
	1925	6.18	0.38	5.71	3.55	5.12	20.94	
	1926	6.00	0.42	6.12	3.35	5.03	20.92	
	1927	6.02	0.40	6.95	3.71	5.36	22.45	
4	1925	6.18	0.44	5.71	3.55	5.03	20.94	
	1926	6.00	0.46	6.12	3.35	5.00	20.92	
	1927	6.02	0.44	6.95	3.71	5.33	22.45	
	1928	6.34	0.43	8.32	4.66	5.49	25.23	
6	1927	6.41	0.61	7.01	3.64	5.38	23.08	
	1928	6.65	0.63	8.43	4.66	5.61	25.99	
	1929	5.27	0.68	5.44	3.81	5.17	20.38	
7	1916	4.31	0.53	6.78	4.64	4.68	20.88	
	1928	6.09	0.63	8.43	5.31	5.52	25.99	
	1916	4.12		6.57	6.08	2.51		19.27
	1922	3.61		3.01	1.11	0.83		8.56
	1923	3.34		2.96	1.90	0.95		9.14
	1924	4.42		5.46	5.21	1.66		16.76

Sources for summary tables on Horses, Cattle and Pigs.

1a. Trudy TsSU, Tom XVIII, M.1923, pp.136-9

1b. Trudy TsSU, Tom VIII, vyp.5, M.1924, pp.134-5

2. Abrégé des données statistiques de l'URSS, M.1925, pp.73-6

3. A.Gayster (ed.) Osnovniye elementy sel.khoz. proizvodstva SSSR, 1916 i 1923-7 gg., M.1930, pp.90-105 uncorrected, pp.134-43

4. Statisticheskii Spravochnik SSSR za 1928, M.1929, pp.166-8.

5. Zhivotnovodstvo SSSR, M.1930, p.136

6. Zhivotnovodstvo SSSR v tsifrakh, M.1932, pp.6-17, and Sel.Khoz.SSSR, Ezhegodnik za 1935 g., M.1936, pp.513-9

7. Zhivotnovodstvo SSSR za 1916-38gg., M.1939, pp.4-5.

1c. P. I.Popov, EO, 1924, no.23/24 pp.LXX11.

Note: * refers to area of USSR less Transcaucasia, Turkestan and possible also Dalnyi Vostok.Krai, Yakutia and Buryat Mongolia

Sources 5 - 7 include all rural animals/peasant, Sovkhoz and Kolkhoz.

Sources 1b - 4 include only peasant animals

Source 1a - includes landowner animals

All figures apart from 1916 refer to the spring count. The 1916 census was in mid-summer.

(in mlns.)	NCR	SPR	CPR	EPR	USSR -SCR
Horses 1916	3.96	8.83	7.12	11.60	31.51
1920	3.69	7.15	5.12	9.45	25.41
% decline	-6.8%	-19.0%	-28.1%	-28.5%	-19.4%
Cattle 1916	8.37	14.45	10.24	16.91	49.97
1920	7.44	11.96	7.18	12.52	39.10
% decline	-11.1%	-17.2%	-29.9%	-26.0%	-21.8%
Pigs 1916	3.34	7.44	3.74	5.15	19.59
1920	2.54	6.19	2.17	3.92	14.83
% decline	-24.0%	-16.8%	-42.0%	-23.9%	-24.3%

Source: Trudy TsSU, Tom XVIII, M.1923, pp.136-9

This table indicates that the level of decline in the numbers of livestock was much more severe in the CPR and EPR than in the NCR or SPR; and that the level of decline in the numbers of horses in the NCR (at less than 7%) was really quite modest in comparison with the large levels of decline indicated for all other regions. The decline in the numbers of cattle and especially pigs in the NCR was much larger, and more comparable with the levels of decline recorded for the other regions although generally still somewhat lower.

From 1921 to 1929 the basic source for the annual data on the numbers of different types of livestock was the spring sample investigation of the peasant household[1]. The spring registration of livestock was carried out immediately after the livestock was put out to pasture. This would be sometime between May and June depending upon the area and the weather.

At first the results from these investigations were treated in the same way as the sown area statistics[2], i.e. they were used to calculate coefficients of change which were then applied to the full census data. The results of these investigations indicated the following continuing

1. For a general account of this spring investigation see above p.327.
2. See above, p.327.

decline in livestock levels:

	Horses		Cattle		Pigs	
	mlns.	%%	mlns.	%%	mlns.	%%
1916	31.51	(100)	49.97	(100)	19.59	(100)
1920	25.41	(80.6)	39.10	(78.2)	14.83	(75.7)
1921	23.33	(74.0)	36.82	(73.7)	12.49	(63.8)
1922	18.88	(59.9)	33.03	(66.1)	7.64	(39.0)

Source: Trudy TsSU, Tom XVIII, M.1923, pp.136-9

By 1922 the indicated fall in the numbers of horses now exceeded the fall in cattle numbers. But the fall in the number of pigs was larger than the fall in any other type of livestock. The large decline in the number of horses relative to the number of cattle was probably indicative of a decision to favour a run down in capital associated with arable farming, (i.e. work stock) above a run down in productive non-work stock, mainly the dairy herds. The large decline in the number of pigs was to be expected as these were the easiest form of stock to replace, due to their shorter growing cycle.

The regional breakdown of the changing numbers of livestock indicated by these data are given in the following table:

		NCR		SPR		CPR		EPR		USSR -SCR	
		mln.	%%	mln.	%%	mln.	%%	mln.	%%	mln.	%%
Horses	1916	3.96	(100)	8.83	(100)	7.12	(100)	11.60	(100)	31.51	(100)
	1920	3.69	(93.2)	7.15	(81.0)	5.12	(71.9)	9.45	(81.5)	25.41	(80.6
	1921	3.75	(94.7)	7.01	(79.4)	3.92	(55.1)	8.65	(74.6)	23.33	(74.0
	1922	3.92	(99.0)	5.17	(58.6)	3.26	(45.8)	6.54	(56.4)	18.88	(59.9
Cattle	1916	8.37	(100)	14.45	(100)	10.24	(100)	16.91	(100)	49.97	(100)
	1920	7.44	(88.9)	11.96	(82.8)	7.18	(70.1)	12.52	(74.0)	39.10	(78.2)
	1921	7.90	(94.4)	11.74	(81.2)	6.43	(62.8)	10.75	(63.6)	36.82	(73.7)
	1922	8.59	(102.6)	10.31	(71.3)	5.99	(58.5)	8.14	(48.1)	33.03	(66.1)
Pigs	1916	3.34	(100)	7.44	(100)	3.74	(100)	5.15	(100)	19.59	(100)
	1920	2.54	(76.0)	6.19	(83.2)	2.17	(58.0)	3.92	(76.1)	14.83	(75.7)
	1921	2.38	(71.3)	5.82	(78.2)	1.16	(31.0)	3.13	(60.8)	12.49	(63.8)
	1922	2.72	(81.4)	3.01	(40.5)	0.67	(17.9)	1.24	(24.1)	7.64	(39.0)

Source: Trudy TsSU, Tom XVIII, M.1923, pp.136-9.

This table indicates that the NCR suffered a far less severe decline than the other regions, that its level of horses and cattle had begún to rise after 1920, and its level of pigs after 1921. By 1922 the number of cattle in the NCR was already indicated to be above the 1916 level, and the number of livestock in all other regions appeared to be continuing to decline. The situation appears the most serious in the CPR which registered less than half the number of horses listed in 1916, only slightly over half the number of cattle and less than a fifth the number of pigs.

In a major article which Popov wrote in December 1924 he presented a series of livestock figures for 1916, 1922-24[1].

This was a very unusual series as it presented a revised figure for 1922 which shows that there had actually been a continued decline in the overall number of horses into 1923; see below and source 1c in summary tables.

(in mln's)

	Horses	cattle	pigs
1916	31.31	50.28	19.27
1922	20.17	35.05	8.56
1923	20.06	38.60	9.14
1924	21.92	45.64	16.76

Source: P.I.Popov EO, 1924, no.23/24 p.LXXII

These data are also the only ones that provide us with an indication of the regional change in livestock numbers spanning the years 1922 to 1923[2]. The regional figures are given in source 1c of the summary table.

With the exception of this series by Popov no other source published after 1923 contains any detailed figures for the earlier years. In 1923 the regional groupings were changed and the procedure for calculating the numbers of livestock was also changed. This change in procedure appears

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1. See P.I.Popov, EO, 1924, No.23/24, pp.LXXll.
2. This is particularly important because the Trudy TsSU, Tom VIII, vyp.5, livestock data is much more difficult to reorganise into regions comparable with the Trudy TsSU Tom XVlll data.

to be directly analogous to the change in procedure for calculating sown area data that was made at this time[1]. Instead of calculating correction coefficients and using the 1920 census, it was decided to relate the results of the spring investigation directly to the estimated number of households. However, the official history of Soviet statistics does not relate this change to the changes in sown area calculations, but instead offers an entirely independent reason for the change. It is claimed that 'work carried out in connection with work on the livestock product balances' demonstrated the existence of an under-estimation in the spring investigation livestock data and the need to apply corrections[2]. The account continues to describe how corrections were made, at first according to expert evaluations, and then from 1924 on the basis of comparisons with the results of budget investigations.

The size of the correction that was made to the livestock data for

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1. See above pp.334-5.

2. See A.M.Bryanskii, in Istoriya Sovetskoi Gosudarstvennoi Statistiki, M.1960, p.121.

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The size of the correction that was made to the livestock data for

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1. See above pp 334-5

2. See A.M.Bryanskii, in Istoriya Sovetskoi Gosudarstvennoi Statistiki, M.1960, p.121.

923 appears to have been about 6.7% for horses and cattle and much less or pigs.

(in mlns.)

1923	horses	cattle	pigs
Early source	20.07	38.68	9.13
1925 source	21.40	41.27	9.39
correction applied	+6.6%	+6.7%	+2.8%

Sources: Early source, Trudy TsSU, Tom VIII, vyp.5, M.1924, pp.134-5.
1925 source Abrégé des données statistiques de l'URSS, M.1925, pp.73-6.

Note: Both series of data refer to the area of the USSR excluding ZSFSR, Turkestan, Dal yi Vostok Krai, Buryat Mongolia.

but for later years much lower levels of correction were applied to horses and cattle and much higher levels to pigs. A detailed series of correction coefficients is available for the years 1924-1927 by comparing the corrected and uncorrected data that were subsequently published by TsSU. These figures appear in source 3a uncorrected and 3b corrected in the summary table given above. The correction coefficients that they imply are given in the following table:

(in mlns.)

	Horses			Cattle			Pigs		
	uncorr-ected	corr-ected	%	uncorr-ected	corr-ected	%	uncorr-ected	corr-ected	%
916a)	35.77			60.56			20.88		
b)	34.35			58.25			20.10		
923	21.90			46.16			9.76		
924	24.21	24.67	+1.9	53.55	56.69	+5.9	17.56	21.31	+21.4
925	26.31	26.00	-1.2	58.11	59.63	+2.6	17.45	20.94	+20.0
926	28.27	28.29	+0.1	61.37	63.03	+2.7	16.84	20.92	+24.2
927	30.55	30.57	+0.1	64.65	65.95	+2.0	18.89	22.45	+18.9

Source: A.Gayster (ed.), Osnovniye elementy Sel. -Khoz. proizvodstva SSSR, 1916 i 1923-7 gg., M.1930, pp.90-1, 134-5.

Note: a) refers to all households, b) refers to peasants only.

The regional breakdowns of these correction coefficients are given in the following table:

The level of corrections applied to livestock data by region in %:

		NCR	SCR	SPR	CPR	EPR	All USSR
Horses	1924	2.5	0	0.4	0.6	3.2	1.9
	1925	0.5	0	0	0	-3.7	-1.1
	1926	0.3	0	0	0	0	0.1
	1927	0.5	0	0	0	0	0.1
Cattle	1924	5.0	0	3.3	8.5	8.6	5.9
	1925	1.7	0	1.9	5.0	3.0	2.6
	1926	1.9	0	1.6	3.9	4.0	2.7
	1927	1.0	0	1.3	3.0	3.1	2.0
Pigs	1924	25.9	0	18.1	21.2	22.4	21.4
	1925	21.4	0	20.0	19.9	19.9	20.0
	1926	24.5	0	24.9	25.0	24.8	24.2
	1927	17.1	0	20.0	19.7	19.9	18.8

Source: A.Gayster (ed.), ibid., M.1930, pp.90-105, 134-43.

By the mid 1920s we see TsSU applying roughly a 20% correction to its sown area data and its data on pig numbers, but less than 3% to cattle numbers and possibly even a deflation to its data on the number of horses.

This divergence seems difficult to justify. It has been explained above that during the period of prodrazverstka allowances of grain were set aside for livestock feed when the size of the levy was estimated and so this could have led to a reduction in concealment of livestock numbers. But I doubt whether this could be expected to have had such a great effect in the mid and late 1920s.

I would suggest, rather, that there was simply less of a pressure on TsSU to inflate the level of livestock numbers and the quantity of knowledge about the numbers of horses was probably much higher that it was for any other agricultural product.

Horses were still subject to periodic military horse censuses. And such censuses were carried out in 1919-20 in 20 gubernii and in all the gubernii in the USSR between 1923 and 1925[1]. These censuses were presumably quite thorough and comprehensive, in the pre-revolutionary tradition, and therefore probably presented a fairly reliable indicator of the number of horses. And these data appear to have indicated that little or no correction was needed to the spring survey results.

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1. See Istoriya Sovetskoi gosudarstvennoi statistiki, M.1960, p.120. Parts of the 1923-25 results appeared in Trudy TsSU, Tom XXXIV, vyp.1, M.1927.

Later in the 1920s another higher series of data appeared; these are given in sources 5-7 of my basic table. They all appear to be basically the same series but with slight differences due to the preliminary nature of some of the data. Comparing these data with Gayster's uncorrected data we can calculate that the following level of corrections were being applied to the data: (in mlns.)

	Horses			Cattle			Pigs		
	uncor-rected	corr-ected	%	Uncor-rected	corr-ected	%	Uncor-rected	corr-ected	%
1916	35.77	35.77		60.56	60.56		20.88	20.88	
1923	21.90	24.55	+12.1	46.16	52.93	+14.7	9.76	12.86	+31.8
1924	24.21	25.69	+6.1	53.55	59.03	+10.2	17.56	22.21	+26.5
1925	26.31	27.08	+2.9	58.11	62.09	+6.8	17.45	21.82	+25.0
1926	28.27	29.20	+3.3	61.37	65.55	+6.8	16.84	21.64	+28.5
1926	30.55	31.54	+3.2	64.65	68.16	+5.4	18.89	23.20	+22.8

Sources: Uncorrected data A.Gayster (ed.) ibid., M.1930, pp.90-1
Corrected data A.Gayster (ed.) Zhivotnovodstvo SSSR, M.1930, pp.136.

The level of correction that has been added to all animals is about 3% higher than in the earlier cases for 1927, about 4% higher for 1925 and 1926 for all animals and 4-5% higher for 1924. For pigs and cattle the level of correction is falling between 1926 and 1927 but for horses it rose somewhat after 1925.

The figures in the corrected series included the livestock in Sovkhozy and Kolkhozy after 1926, but as we shall see later their magnitude was so small as to make little difference in these early years. The regional distribution of these corrections is similar to that given above as far as can be seen for the regions and animals given[1].

1. The level of corrections by region is given for cattle and pigs. in 1926 and 1927 in A.Gayster (ed.), Zhivotnovodstvo SSSR, M.1930, pp.260-1.

Regional corrections applied to data on numbers of animals (in %).

	Cattle		Pigs	
	1926	1927	1926	1927
Consumer Regions	0	0	25	20
BSSR	8	3	20	10
SPR				
Ukraine	0	0	25	20
Sev.Kavkaz	4	3	25	20
CPR	4	3	25	20
Sibir	4	3	25	20

The existence of these fairly large, but changing levels of correction coefficients makes it very difficult to construct an overall series of data covering all years with a regional breakdown. And in my own attempts to construct a comparable regional series of data for all livestock throughout this period, I have found it impossible to reconcile the data for pigs with this very large level of corrections in the late 1920s with the uncorrected 1916 census data figures. In my computed series of data[1] the pre-revolution pig data have been given a substantial correction to make them comparable with the data in the late 1920s.

My computed series of data are given below. In these series all the data have been adjusted to make them comparable with the data of the late 1920s. But as explained with the exception of pigs the late 1920s series were very similar in size to the early 1920s data.

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1. See appendix for the calculation of these data.

A computed series of regional livestock data in millions.

	NCR		SCR	SPR		CPR		EPR		USSR	
Horses											
1916	5.5		1.0	8.3		8.2		13.0		35.8	35.8
1920	5.1		(1.2)	7.6		5.9		11.7		31.5	
21	5.2		(1.2)	7.5		4.5		10.7		29.1	29.6
22	5.5		(1.1)	5.5		3.8		8.1		24.0	24.1
23	5.7		1.2	5.2		4.1		7.2		23.6	24.6
24	5.8		1.2	5.3		4.7		8.2		25.2	25.7
25	6.1		1.2	5.7		5.0		8.7		26.7	27.1
26	6.2		1.4	6.3		5.6		9.6		29.1	29.2
27	6.3		1.5	6.9		6.2		10.5		31.4	31.5
28	6.4		1.7	7.5		6.6		11.2		33.4	33.5
29	6.3		1.8	7.8		7.1		11.5		34.5	34.6
Cattle											
1916	11.2	10.2	6.6	12.6	12.8	12.4	12.4	19.6	18.6	62.4 60.6	60.6
1920	10.0		(5.5)	12.7		8.7		16.2		53.1	
21	10.6		(5.5)	12.4		7.8		14.0		50.3	50.8
22	11.5		(5.0)	10.9		7.2		10.6		45.2	45.8
23	12.0		6.0	11.0		9.3		11.3		49.6	52.9
24	12.8		6.0	12.4		11.7		15.0		57.9	59.0
25	13.1		6.4	12.7		11.9		16.9		61.0	62.1
26	12.3		6.8	13.4		12.8		19.0		64.3	65.6
27	11.9		7.3	13.8		13.4		21.0		67.4	68.2
28	12.5		9.2	14.8		14.1		21.0		71.6	70.7
29	11.9		9.3	13.1		13.9		19.7		67.9	67.2
Pigs											
1916	6.5	4.6	0.8	9.1	6.7	5.1	4.4	8.0	4.7	29.5	20.9
1920	5.1		(0.5)	7.5		3.0		6.1		22.2	
21	4.8		(0.5)	7.1		1.6		4.9		18.8	19.4
22	5.4		(0.5)	3.7		1.4		1.9		12.8	12.0
23	5.0		(0.4)	3.6		1.6		2.2		12.9	12.9
24	6.6		0.5	6.6		4.3		3.8		21.8	22.2
25	6.6		0.5	5.8		3.5		5.1		21.6	21.8
26	6.4		0.6	6.2		3.3		5.1		21.6	21.6
27	6.4		0.6	7.0		3.6		5.4		23.0	23.2
28	6.7		0.6	8.4		4.7		5.6		26.0	26.1
29	5.3		0.7	5.4		3.8		5.2		20.4	20.5

The changing fodder requirement of the herds is not solely dependent on the numbers of different animals, it is also dependent upon the structure of the herd, the age and size of the animal. The following table gives an indication of how the herd structure changed over this period:

	Horse			Cattle		
	all	full grown	% of full grown	all	cows	% of cows
1916	35.77	27.67	77.4	60.56	26.03	43.0
1921	**29.6**	**24.2**	**81.8**	**50.8**	**27.2**	**53.5**
1922	24.12	20.03	83.0	45.79	24.83	54.23
1923	24.55	19.89	81.0	52.93	26.06	49.21
1924	25.69	19.89	77.4	59.03	27.14	46.0
1925	27.08	20.35	75.1	62.09	28.62	46.1
1926	29.20	21.61	74.0	65.55	29.74	45.4
1927	31.54	23.12	73.3	68.16	29.96	44.0
1928	33.51	24.25	72.4	70.67	30.75	43.5
1929	34.61	25.16	72.7	67.23	30.34	45.1

Source: Zhivotnovodstvo SSSR, v tsifrakh, M.1932, pp. 4,9.

The losses in the period up till 1922 were predominantly of young not yet economically useful animals. An attempt appears to have been made to preserve the number of full grown horses and cows. The proportion of both these groups increased in the herds during this period. From 1922 to 1928 the share of full grown to all horses and of cows to all cattle fell; this is indicative of long term investment by the peasantry in producing a greater share of replacement animals. After 1928 we see a reversal as the peasants again begin to decrease their investment in young animals.

The importance of the change in herd structure for us is that full grown horses or cows consume more grain than do younger animals; therefore a change in the structure of the herd will result in a change in the average animal fodder consumption norm. This will have to be borne in mind when considering the levels of livestock feed utilisation.

Later in this section, when we analyse livestock fodder norms for different animals we shall see that the following ratios of grain fodder consumption were used in the late 1920's:[1]

1 full grown horse = 5.6 cows

1 cow = 3 other cattle

1 full grown horse = 2 full grown pigs

1 full grown pig = 3 piglets

If we assume also that 1 full grown horse = 2 younger (less than 4 year old) horses[2], then we have sufficient relationships to convert all our livestock into full grown horse equivalents. However the number of pigs equivalent to a full grown horse, as given in these relationships does seem to be extremely large so I have calculated an additional variant in which 1 full grown horse = 3 full grown pigs.

These conversion coefficients have been used in the following tabulation in which all the livestock for the 1920's have been converted into their full grown horse equivalents:

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1. See below p. 552. These are the ratios based on the 1925/26-1927/28 average grain fodder consumption patterns received from budget studies. See Zhivotnovodstvo SSSR v tsifrakh, M. 1932, pp. 128-141.

2. This was a relationship proposed by Fortunatov and accepted by TsSU in the construction of the 1923/24 balance of the national economy. (See Trudy TsSU, Tom XXIX, M. 1926, p. 124.)

	All horses	coef.	Grown horse equiv	All cattle	coef.	Cow equiv	coef.	Grown horse equiv.
1916	35.8	0.88	31.5	60.6	0.62	37.6	0.18	6.8
1921	29.6	0.91	26.9	50.8	0.69	35.1	0.18	6.3
1922	24.1	0.91	21.9	45.8	0.69	31.6	0.18	5.7
1923	24.6	0.90	22.1	52.9	0.66	34.9	0.18	6.3
1924	25.7	0.88	22.6	59.0	0.64	37.8	0.18	6.8
1925	27.1	0.87	23.6	62.1	0.64	39.7	0.18	7.2
1926	29.2	0.87	25.4	65.6	0.63	41.3	0.18	7.4
1927	31.5	0.86	27.1	68.2	0.63	43.0	0.18	7.7
1928	33.5	0.86	28.8	70.7	0.63	44.5	0.18	8.0
1929	34.6	0.86	29.8	67.2	0.64	43.0	0.18	7.7

	All pigs	coef	Grown pig equiv	coef. (1)	Grown horse equiv.	coef. (2)	Grown horse equiv.	All Animals in grown horse equiv. (1)	(2)
1916	20.9	0.56	11.7	0.5	5.9	0.3	3.5	44.2	41.8
1921	19.4	0.55	10.7	0.5	5.3	0.3	3.2	38.5	36.4
1922	12.1	0.55	6.7	0.5	3.3	0.3	2.0	30.9	29.6
1923	12.9	0.52	6.7	0.5	3.3	0.3	2.0	31.7	30.4
1924	22.2	0.50	11.1	0.5	5.6	0.3	3.3	35.0	32.7
1925	21.8	0.50	10.9	0.5	5.5	0.3	3.3	36.3	34.1
1926	21.6	0.50	10.8	0.5	5.4	0.3	3.2	38.2	36.0
1927	23.1	0.49	11.3	0.5	5.7	0.3	3.4	40.5	38.2
1928	26.0	0.44	11.4	0.5	5.7	0.3	3.4	42.5	40.2
1929	20.4	0.50	10.2	0.5	5.1	0.3	3.1	42.6	40.6

Apart from the age of the different animals, their fodder requirements are directly related to their size. And to some extent their size is related to how well the animals are fed. Unfortunately there are very little data available on the size of animals in these years. The only available data refer to the average slaughter weight of cattle at the central abattoirs.

The following data indicate the low and decreasing average weight of cattle slaughtered before the war, the improvement in the mid 1920s and the sudden deterioration in 1928/29.

	Nifontov's data	Drozdov's data
1894-1903	237 kgms.	
1909	232 "	
10	231 "	
11	224 "	
12	221 "	
13	225 "	238 kgms
1925/26		250 "
26/27		264 "
27/28	247 "	
28/29	225 "	

Sources: V.P.Nifontov, Produktsiya zhivotnovodstvo SSSR, M.1937, p.27
V.Drozdov, E O , Feb.1929, p.171.

The sharp decrease in average weight in 1928/29 is more likely to be the effect of sending a slightly younger cohort of cattle to slaughter in 1928/29 than due to a 10% drop in weight of equally aged animals. Nevertheless the other figures presumably indicate animals of the same age and these figures underline the sharp change that occurred in livestock farming in these years.

Finally I will just present a few figures giving an indication of

the breakdown by sector of the ownership of these animals. Data are only available from 1926 and are given in the following table:

The distribution of livestock according to sector of production, in mlns:

	Horse				Cattle				Pigs			
	All	Ind	CF	SF	All	Ind	CF	SF	All	Ind	CF	SF
1926	29.26	29.05	0.5		65.55	65.28	0.27		21.64	21.55	0.09	
1927	31.54	31.35	0.05	0.10	68.16	67.88	0.09	0.16	23.20	23.09	0.06	0.04
1928	33.51	33.24	0.11	0.12	70.67	70.31	0.15	0.18	26.12	25.98	0.07	0.06
1929	34.61	34.16	0.33	0.14	67.23	66.31	0.38	0.20	20.53	20.34	0.13	0.05
1926	100	99.5	0.5		100	99.6	0.4		100	99.6	0.4	
1927	100	99.4	0.2	0.3	100	99.6	0.1	0.2	100	99.5	0.3	0.2
1928	100	99.2	0.3	0.4	100	99.5	0.2	0.3	100	99.5	0.3	0.2
1929	100	98.5	1.0	0.5	100	99.1	0.6	0.3	100	99.1	0.6	0.2

Source: Zhivotnovodstvo SSSR, M.1930, pp.136-151

It should however be remembered that the livestock counts upon which these figures were calculated took place in spring and so do not fully reflect the dramatic changes that occurred later in 1929.

c)

ii) The available data on livestock fodder norms 1918-29.

As the new Soviet government faced its first harvest in 1918, it adopted the provisional government's policy of prodrazverstka. But new norms were introduced for the fodder allowances of producer's livestock. The new norms were much lower than those set by the Ministry of Food Supply in September 1917, but were higher than those which had been introduced earlier in March 1917. These new norms are given below in comparison with the earlier norms:

		Provisional Government norms		New Soviet norms
		March 1917	September 1917	August 1918
horses	full grown	0.246	0.410	0.295
	aged 0-1		0.131	0.082
cattle	full grown	0.098	0.197	0.147
	aged 0-1	0.049	0.098	0.082
pigs		0.098	0.082	0.082

Sources: Provisional government norms see above p. 148.
Soviet norms August 1918 from N.D.Kondratiev, ibid., M.1922, p.122.

They returned the level of fodder norms to a level more comparable to those given in Lositsky's balance[1].

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1. See above p. 257.

The task of collecting and working out data on livestock fodder norms was at first given little priority in TsSU. The local statisticians and correspondents had been instructed to send data to the centre concerning the length of time the animals were kept in stalls, their rations when they were in the stalls, the condition of the pasture and the time the animals were let out to pasture. In order to be thorough, the statisticians and correspondents would have had to make separate replies for the different type of animal and separate replies for the different age and size of the animals. The statisticians were short of time and were being pressed for other data and so the questions concerning livestock feed tended to be ignored or filled in very roughly.

In 1922, in order to get round the neglect of this question on the general programme of the spring and autumn investigations, Dubenetsky's department sent out a questionnaire to the local volost statisticians and voluntary correspondents, accompanied by a note explaining how important this data was for the construction of the grain forage balance. This questionnaire was subsequently sent out regularly throughout the 1920s. The response was quite good. In 1922/23 Dubenetsky received 25,000 replies, and in 1923/24 30,000. This was a reply by 90% of all those receiving the questionnaire[1].

By 1927 TsSU was reported to be receiving 40,000 reports from the voluntary correspondents about the state of livestock fodder getting[2]. But these data were still not regarded very highly and Dubenetsky referred to them as one of the weakest links in the grain forage balance[3]. Other statisticians, particularly Lositsky and Bryansky, favoured using the data in the budget studies to construct correction coefficients to inflate the basic mass data from the correspondents. Quite substantial corrections

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1. See N.Dubenetsky, in Trudy TsSU, Tom XXIX, M.1926, p.124.
2. N.I.Dubenetsky, SO, 1928, no.4, p. 16.
3. N.I.Dubenetsky, ibid., p. 16.

appear to have been made and they appear to have been repeatedly revised. The following table provides an indication of the changing figures of grain fodder utilisation that were accepted during this period:

Grain used as livestock fodder in all of the pre-1939 area of the USSR in mln.tons

	Early TsSU		Gos-plan	Expert Soviet			Bryan-sky 1930	Nifon-tov 1932	TsUNKhU	
	1	2	3	4	5	6	7	8	9	10
All Livestock										
1913	12.1		18.9				20.2			
1920/21	4.3		8.7							
1921/22			6.5							
1922/23	6.9		9.2							
1923/24	7.7	9.3	9.5				10.0			
1924/25	7.7		9.6				13.3			
1925/26	12.1		13.4	16.9	19.9	20.9	19.2	20.9		
1926/27				18.4	22.5	24.3	22.6	24.3		
1927/28					22.3	24.8	20.9	23.8		
1928/29						21.1	20.1	22.6		
1929/30							17.5	21.6		
1928									21.7	18.5
1929									21.0	18.3
Rural Livestock										
1925/26	11.3		12.4	15.8	18.4	19.4				
1926/27				17.2	20.9	22.8				
1927/28					20.3	23.3				
1928/29						22.6				
1928										
1929										

Sources of data for above table from different sources:

1. 1913 P.I.Popov, Prozvodstvo khlebov...,M.1921,p.32. 1923/24-1925/26 Abrégé des donnés statistiques de l'URSS,M.1925, p.76
2. Trudy TsSU, Tom XXIX, chast 2, M.1926, p.105
3. N.M.Vishnevsky,'Khlebo-furazhnyi balans' in BSE, Tom IV,M.1926, p.479
4. N.I.Dubenetsky, SO, 1927, no.4, p.24.
5. Predpolozhitelnyi khlebo-furazhnyi balans na 1927/28 sel.khoz.god., M.1927, p.28.
6. Osnovnive elementy i produktsiya sel.khoz.SSSR za 1925/26-1928/29gg., M.1928,p.117.
7. A.I.Gayster (ed.), Zhivotnovodstvo SSSR, M.1930, p.58.
8. V.P.Nifontov (compiler), Zhivotnovodstvo SSSR v tsifrakh, M.1932, p.127.
9. Materialy po balansu..., M.1932, pp. 259-61. (Note: These figures include millfeed.)
10. Yu.A.Moshkov, Zernovaya problema..., M.1966, p.231. (Note: These figures exclude mill

The revisions are quite enormous. The 1925/26 fodder utilisation figure was inflated by over 80%. The figures given in the earlier part of this section indicate that no more than 10% (and probably much less) could be explained in terms of changes in the accepted livestock figures. Most of this difference must therefore be the result of changes in the level of consumption norm accepted. We will look at these figures in more detail.

The earliest and most detailed post-revolutionary livestock fodder data that are available are the data calculated by Dubenetsky for the 1923/24 balance of the national economy. The fodder figures from this balance are given in column 2 of the above summary table.

There is some slight uncertainty over the size of the fodder element in this balance. In the text[1] a fodder utilisation figure of 10.7 million tons is given, while in the tables[2] a lower figure of 9.3 mln.tons is given. I will be working throughout with the data from the more detailed tabular part. Dubenetsky informs us that the livestock feed norms used in this balance were based mainly on the results of the 1922/23 investigation of fodder norms because the results of the 1923/24 investigation were still not available when the 1923/24 balance was being drawn up.[3] He added that the results from the 1922/23 investigation were probably higher than the 1923/24 results would have been and that using these data would not therefore result in an under-estimation[4]. Dubenetsky also states that the results from these correspondents were probably a little high because the correspondents tended to describe larger and wealthier than average households, and these households would have higher than average

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1. Trudy TsSU, Tom.XXIX, chast 1, M.1926, p.127.
2. Trudy TsSU, Tom XXIX, chast 2, M.1926, p.105.
3. See N.I.Dubenetsky, ibid., chast 1, p.124.
4. See N.I.Dubenetsky, ibid., p.124.

livestock fodder norms. In order to offset this effect he claims that some slight deflation was made to the results. But he fails to tell us the size of this deflation and a comparison with the uncorrected results from the 1922/23 survey would tend to indicate that a slight overall inflation rather than a deflation had been applied to these figures:

(tons per horse per year)	1922/23 uncorrected data for work horse	corrected data for all horses
USSR	0.326	0.328
Consumer Regions	0.246	0.269
SPR		
Ukraine	0.454	0.467
Sev.Kavkaz	0.334	0.421
CPR (Producer region)	0.411	0.426
EPR		
Siberia	0.211	0.165

Sources: 1922/23 uncorrected from 1923g v.sel.khoz.otnoshenii, M.1927, pp.34-5.

1922/23 corrected from Trudy TsSU, Tom XXIX, M.1926, chast 2, p.105.

Another problem with these data was in making the results of the survey applicable to all types of livestock. The questionnaires apparently only asked for data on work horses cows and sheep. In order to calculate the norms for other animals and for all animals in general, Dubenetsky accepted the livestock fodder equivalency ratios which had earlier been proposed by the distinguished pre-revolutionary statistician A.F.Fortunatov. These fodder equivalency ratios are[1]:

1 work horse = two young horses (aged 1-4 years), 2 cows or 2 oxen
= 4 calves.

1. See N.I.Dubenetsky, ibid., p.124, Note: Dubenetsky fails to mention how the norms for pigs were calculated. Presumably data were also collected for pigs.

The regional norms for the different animals are given in the table below:

Livestock feed by animal and by region for 1923/24 according to the 1923/24 balance in tons per animal per year.

	NCR	SCR	SPR UkSSR	Sev. Kav.	All SPR	CPR	EPR Sib.	Kir-giz.	All EPR	USSR
Horses										
grain	0.195		0.328	0.259		0.295	0.144	0.061		0.234
flour	-		0.041	0.051		0.021	-	-		0.016
bran	0.074		0.098	0.111		0.110	0.021	0.021		0.077
all	0.269		0.467	0.421	0.457	0.476	0.163	0.082	0.142	0.328
potatoes	0.077		0.139	-		0.033	-	-		0.052
straw	0.197		0.721	0.333		0.786	0.382	0.154		0.506
chaff	0.088		0.410	0.388		0.193	0.087	0.110		0.193
hay	1.944		0.596	0.967		0.986	1.414	1.189		1.224
Cattle										
grain	0.003		0.052	0.054		0.002	-	0.002		0.010
flour	-		-	0.025		0.013	-	-		0.011
bran	0.046		0.072	0.054		0.066	0.038	0.007		0.054
all	0.049		0.124	0.133	0.126	0.080	0.038	0.009	0.029	0.075
hay	0.957		0.480	0.662		0.505	0.894	0.798		0.691
Pigs										
grain	0.011		0.018	0.611		0.008	0.011	0.016		0.013
flour	-		0.020	0.620		0.011	-	-		0.008
bran	0.054		0.044	0.044		0.052	0.051	0.044		0.052
all	0.070		0.082	0.075	0.081	0.071	0.062	0.061	0.062	0.076
Sheep										
hay	0.275		0.159			0.120	0.274	0.231		0.190

Source: Trudy TsSU, Tom XXIX, chast 2, M.1926, p.105.

The data have been regrouped and regional figures for SPR and EPR have been calculated using the 1923/24 livestock figures given in the table on p.106 of the above source.

From this table it can be seen that the average horse consumed 0.33 tons of grain a year, which was about 4.4 times as much as the average cattle and pig consumed[1]. For all types of livestock the SPR had the

1. The reason why these proportions differ from those mentioned earlier, based on Fortunatov's work, is that the earlier figures referred to animals of specific ages, and did not refer to the norms based on the whole population of animals. (Briefly, horses lived longer than other animals, therefore the proportion of full grown horses to all horses was higher than the proportion of cows to cattle. Hence although 1 full grown horse might be equivalent to 2 full grown cattle, the average horse might be equivalent to 4 average cattle. The regional

highest level of grain fodder use, then came the CPR followed by the NCR and the EPR in that order. A more precise indication of the relative levels of the different regions for the different animals is given in the table below:

1923/24	USSR in tons/ year	Livestock fodder utilisation in %% of all USSR level in				
		USSR	NCR	SPR	CPR	EPR
Horse	0.328	100	82.0	139.3	129.9	43.3
Cattle	0.075	100	65.3	168.0	106.7	38.7
Pigs	0.074	100	94.6	109.5	95.9	83.8

Source: compiled from table above, data from Trudy TsSU, Tom XXIX, M.1926, chast 2, p.105.

From the table given above it will be noticed that those regions where livestock consumed a high share of grain were also those where livestock consumed a low share of hay.

The table also allows us to get an indication of the breakdown of the fodder used by the type of grain. It will be seen that almost three-quarters of all the grain consumed by cattle and pigs was actually bran, while less than a quarter of the grain consumed by horses was bran and most was unprocessed grain. The following table allows us to get a better picture of the overall breakdown of grain utilisation as fodder by region and also a more detailed breakdown according to type of grain: (see table over page)

The largest single grain which was consumed as fodder was oats which accounted for 43% of all grain fodder. In the NCR, CPR and EPR the proportion of fodder taken up by oats was much larger, respectively 56%, 56% and 64%. But in the SCR and the SPR oats accounted for only 7 and 22% of the fodder, barley being more important in these two regions, followed

by maize. Of the food grains, most of the fodder consumption was in the form of bran, but the CPR was an exception where almost a quarter of a million tons of rye flour was used as fodder, mainly for horses.

Livestock feed by grain and by region used in 1923/24 according to the 1923/24 balances.

	NCR	SPR	SPR (a) UkSSR	SPR (b) Sev. Kaz.	SPR all SPR	EPR CPR	EPR (a) Sib.	EPR (b) Kirg.	EPR all EPR	USSR
Rye flour						0.241				0.241
bran	0.491	0.002	0.457	0.026	0.473	0.717	0.090	0.003	0.093	1.787
all	0.491	0.002	0.457	0.026	0.473	0.958	0.090	0.003	0.093	2.028
Wheat bran	0.064	0.116	0.157	0.177	0.334	0.154	0.092	0.015	0.107	0.781
Oats grain	0.907	0.033	0.632	0.052	0.684	1.741	0.485	0.052	0.537	3.903
bran	0.041	-	-			0.067	0.002		0.002	0.110
all	0.948	0.033	0.632	0.052	0.684	1.808	0.487	0.052	0.539	4.013
Barley grain	-	0.128	0.632	0.197	0.829	-	-	0.018	0.018	0.975
flour		0.018								
bran	0.051	0.016	0.057	0.013	0.070	0.043	0.007	0.002	0.009	0.188
all	0.051	0.162	0.689	0.210	0.899	0.043	0.007	0.020	0.027	1.181
Millet and Buckwheat	0.141	0.020	0.134	0.025	0.159	0.290	0.051	0.618	0.069	0.678
Maize grain	-	0.047	-	0.123	0.123	-	-	-	-	0.170
flour	-	-	0.346	0.108	0.454	-	-	-	-	0.454
all	-	0.047	0.346	0.231	0.577	-		-	-	0.624
Other	-	0.039	-	-	-	-		-	-	0.041
All grain	0.907	0.216	1.265	0.372	1.637	1.741	0.485	0.070	0.555	5.057
flour	-	0.018	0.346	0.108	0.454	0.241	-	-	-	0.713
bran	0.788	0.192	0.806	0.241	1.047	1.271	0.242	0.038	0.280	3.577
all	1.695	0.424	2.416	0.721	3.137	3.253	0.727	0.108	0.835	9.346

Source: Trudy TsSU, Tom XIX, chast 2, M.1926, p.105.

None of the livestock figures in any of the later balances were given in anything like the detail of this 1923/24 balance.

In the late 1920s TsSU published some detailed livestock data which were based upon the budget investigations. No explanation was given as to whether these data had been adjusted to compensate for the untypical nature of the households investigated. The resulting data gave extremely high figures and it seems highly doubtful that any corrections had been made[1].

The norms given from these budget studies are presented below, in comparison with the earlier available norms:

(tons per animal per year)

Wartime rations maxima	full-grown horse	cow	Young cattle	calves	Pigs	Piglets
March 1917	0.246	0.098		0.049	0.098	
September 1917	0.410	0.197		0.098	0.082	
August 1917	0.295	0.147		0.082	0.082	
1923/24	0.328	0.075			0.076	
Budget Studies						
1925/26	0.462	0.081				
1926/27	0.590	0.103				
1927/28	0.455	0.088				
1928/29	0.408	0.076	0.025	0.032	0.264	
1924/25-1926/27	0.513	0.090			0.239	
1925/26-1927/28	0.502	0.091	0.031	0.028	0.237	0.072

Source: for wartime rations and 1923/24 TsSU norms see above.
1924/25-1926/27 budget studies see Stat.spravochnik SSSR 1928, M.1928, pp.414-19
1925/26, 1928/29 Zhivotnovodstvo SSSR v tsifrakh, M.1932, pp.128-49. (Much of this latter source first appeared in Zhivotnovodstvo SSSR, M.1930, pp.196-213.)

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1. In most other branches of statistics the statisticians were most eager to describe these adjustments if they had been made.

The budget studies levels are extremely high for horses and especially for pigs. The horse fodder norms were twice as high as the Provisional Government's initial maximum norm. The pig figures are more than two and a half times above all the wartime maximum norms and were more than three times as high as the 1923/24 norms. The cows and calves were given, on the other hand, only half the wartime maximum ration.

Given the shortage of horses in most regions after the decline of the early 1920s, we might well have expected there to be some increase in the level of fodder grain given to horses. The following table presents the 1925/26-1927/28 fodder norms with a more detailed breakdown by type of grain and with an indication of the major other non-grain elements in the fodder balance:

Fodder requirements for different animals: (tons per animal per year)

Full grown horse	Grain produce	Oats	Barley	Maize	flour	bran	Succulents	Hay
1925/26	0.462	0.250	0.020	0.032	0.112	0.032	0.040	1.260
1926/27	0.590	0.328	0.023	0.024	0.156	0.046	0.043	1.415
1927/28	0.455	0.231	0.020	0.021	0.111	0.038	0.028	1.377
average	0.502	0.270	0.021	0.026	0.126	0.039	0.037	1.351
Cow								
1925/26	0.081	-	-	0.003	0.044	0.027	0.099	0.666
1926/27	0.103	-	-	0.002	0.054	0.044	0.125	0.736
1927/28	0.088	0.001	-	0.002	0.044	0.035	0.080	0.758
average	0.091	-	-	0.002	0.047	0.035	0.101	0.720
Pigs								
1925/26-1927/28	0.237	0.065			0.172		0.510	-

Sources: Zhivodnovodstvo SSSR v tsifrakh, M.1932, pp.128-40.

It will be seen that most of the grain consumed by horses was oats while cows consumed no oats or barley but primarily flour and bran. Cows and horses were not therefore competing for these grain fodder crops as

much as might appear. The cows also consumed a higher proportion of hay than did horses and a much higher proportion of succulents (potatoes and beet). These differences in the overall fodder balance for the two animals might well explain some of the paradox of the apparently low increase in grain fodder used by cows.

Pigs consumed no hay, a very high proportion of succulents and two-and-a-half times as much flour and bran as grain.

I have only recomputed the regional grain norms for full grown horse for the average period 1925/26-1927/28 and will assume that the regional differences for the other animals followed roughly this pattern.

The regional figures are given below in comparison with the 1923/24 regional figures.

Grain fodder norms for full grown horses in tons per head per year:

	1923/24 accounts	1925/26-1927/28 budgets	Difference
NCR	0.269	0.420	+56%
SCR	-	0.326	-
SPR	0.457	0.654	+43%
CPR	0.476	0.690	+45%
EPR	0.142	0.398 (0.311)	+180% (119%)
USSR	0.328	0.502	+53%

Sources: 1923/24 see above

1925/26-1927/28 computed from Zhivonovodstvo SSSR, M.1930 pp.142-7, 196-9.

Note: bracketed figures refer to the EPR without the Urals.

It will be seen that with the exception of EPR the budgets recorded a growth of about 45% in the SPR and CPR and 56% in the NCR. The figure for the EPR is a little misleading since the 1923/24 regionalisation of the EPR excluded the Urals which had the highest level of norms in the EPR.

My bracketed figures exclude the Urals from the 1925/26 EPR region, but the results still show a very large growth in grain fodder consumption in this region.

These budget data also provided an indication of the fodder norms used by different social groups. Of course the results depend upon how the different groups were defined and concerning that question the source says nothing. Nevertheless the figures do provide an interesting indication of the differences in fodder utilisation that were claimed at the time.

Fodder norms for different social groups of animal owners according to the 1928/29 budgets

	all	Bednyaki	Serednyaki	Kulaki
Horses				
NCR				
Moskov. Ob.	100	60.3	98.5	123.5
Nizhegor.Krai	100	64.0	92.1	162.3
CPR				
Ts.Chernozem Ob.	100	84.4	99.0	129.2
N.Volzhskii K.	100	47.4	105.3	(96.1)
EPR				
Uralsk Ob.	100	64.7	96.5	129.4
Zap.Sib.	100	60.6	99.1	123.9
Vost.Sib.	100	60.2	103.7	110.2
All	100	66.7	97.9	122.6
Pigs				
NCR				
Mosk.Ob.	100	40.0	104.0	104.0
Nizhegor.Krai	100	73.7	100.0	136.8
CPR				
Ts.Chernozem.Ob.	100	87.2	102.1	106.4
N.Volzhskii Kr.	100	64.1	94.9	120.5
EPR				
Uralsk Ob.	100	54.5	100	104.5
Zap.Sib.	100	75.6	100	124.4
Vost.Sib.	100	94.4	94.4	152.8
All	100	81.8	97.0	118.2

Source: Zhivotnovodstvo SSSR v tsifrakh, M.1932, p.149.

These figures again re-emphasise the importance of ensuring that the survey data gave a representative distribution between the different kinds of households. We cannot be sure that the budget studies data cited in the above pages did not come from exceptionally well-off and well run households which might well have subsequently been classified as kulak. Unfortunately the socio-economically differentiated data presented above were only given in relative terms so we cannot relate any of these socio-economically differentiated figures to the results from the budget studies as a whole. But at most I would suggest that for horses and cattle the distribution error might cause an upward bias in these figures by 10% and so even when this has been discounted there remains an indication of a very substantial increase in the levels of grain fodder consumption in the late 1920s, both in comparison with the early 1920s and also with the pre-war period.

The errors likely to be involved in the pig fodder norms are I think much greater but even if we allow a discount of 30% here we still remain with a level of pig grain fodder consumption that was twice the stipulated wartime norm maximum.

The livestock fodder norms for 1925/26-1927/28 as given and as recommended for acceptance in tons/animal/year.

	norms as given	possible adjustment	recommended norms
Horses	0.502	-10%	0.452
Cows	0.091	-10%	0.082
Pigs	0.237	-30%	0.166

Finally, I have taken the rough grain fodder utilisation figures for the different animals and differently aged animals and have converted all the animals into their full grown horse grain fodder utilisation

equivalents . These figures were then related to the different total livestock feed utilisation figures given by different sources for different years[1], in order to assess what these figures imply for the average grain fodder norm for a full grown horse or its equivalent. The results are given in the following table in comparison with my recommended figures.

Implied Grain fodder utilisation in tons per head per year of a full grown horse equivalent according to different sources.

	Early TsSU		Gosplan Expert Soviet				Bry-ansky 1930	Nifon-tov 1932	TsUNKhU		My recom mended figures
	1	2	3	4	5	6	7	8	9	10	
1913	0.289		0.452				0.483				
1920/21	0.118		0.239								
21/22			0.226								
22/23	0.227		0.303								
23/24	0.235	0.284	0.291				0.306				
24/25	0.226		0.282				0.390				
25/26	0.355		0.372	0.469	0.553	0.581	0.533	0.581			0.416
26/27				0.482			0.592	0.636			0.531
27/28							0.520	0.592			0.410
28/29							0.495	0.557			0.367
29/30											
1928									0.540	0.460	
1929									0.517	0.451	

Sources: See text and listing of sources on p. 545.

It will be seen from this table that my recommended figures are 17% above the early TsSU figures for 1925/26, but 11% below the early Expert Soviet figures and 25-28% below the later Expert Soviet, Bryansky and Nifontov figures. The aggregated figures given by Bryansky and Nifontov appear to have been 15% above the budget studies figures that they presented. I can see no justification for this other than to ensure that the inflated grain forage balances of the late 1920s balanced.

1. See tables on pp. 504b, variant 2, 545.

d) Industrial utilisation of grain

The discussion of the industrial utilisation of grain in this section will again be primarily concerned with utilisation other than in the milling industry. The produce of the milling industry, flour and bran have already been discussed in the sections on personal consumption and livestock fodder. Very little grain was used by industry in this period. As in the pre-war period, the major non-milling utilisation of grain was in the distillation industry. There was a rapid increase in the use of grain in the production of alcohol after 1928. This was a consequence of the increasing industrial demand for alcohol brought about by Lebedev's work on synthesising rubber from ethyl alcohol. But nevertheless the utilisation of grain in the distillation industry only increased from 0.124 million tons in 1928/29 to 0.309 million tons in 1929/30[1], and so was smaller than before the War. Of course these figures only refer to the production of alcohol in large-scale industry and the 1928/29 figure is probably a bit misleading because it was probably somewhat lower than the level in earlier years in the 1920s when the supply situation had not been so strained. The level of illegal private distillation of alcohol was probably no less than before the War[2] and so this probably used another half million tons of grain a year.

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1. See Ya.I.Stochik in Ezhegodnik khleboooborøta No.4/5 za 1929/30 i 1930/31gg.,M.1932, p.30. In the following year the utilisation of grain for this purpose rose to 0.73 million tons.

2. E.H.Carr and R.W.Davies, Foundations of a planned economy 1926-1929, volume 1,part 2, p.761, cites a TsSU investigation which claimed to reveal that 600 million litres of samogon were being consumed in the RSFSR alone. This would give us the figure of about 860 million litres for the whole of the USSR which would require about 0.4 million tons of grain given the pre-war conversion rates cited above, p.150.

According to Stochik the brewing industry used only 0.012 million tons of grain from central supplies in 1928/29 and 0.085 million tons in 1929/30[1]. Again these are very low figures, and probably much lower than normal because of the exceptional supply problems of 1928/29.

In the various grain forage balances that were drawn up at this time the amount of grain allocated to industrial use (other than the milling industry) was normally in the order of 0.4-0.7 million tons in the early 1920s rising to 1 million and 1.4 million tons in some of the higher Gosplan balances. The later Expert Soviet and TsUNkhU balances gave figures of 1-1.5 million tons, but these figures appear to have included also the grain used for military consumption which must have been about 0.5-0.7 million tons. An allowance of about 0.8 million tons to non-milling industrial use of grain would appear to be quite generous.

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1. See Ya.I.Stochik, ibid., p.30.

e) Data on military use of grain

Little can be said about the quantity of grain used by the military. All detailed information on this was a military secret. We can make an approximate estimation of its scale from our knowledge of the size of the army and there are a few indications of the size of military requirements from some of the grain forage balances.

As described above, on the eve of the Revolution the army probably numbered about 7.9 million men[1]. These were soon dispersed and in the summer of 1918 the new Soviet army was reported to number just 306,000[2]. By January the numbers had risen slightly to 520,000. But as the Civil War developed, the numbers in the army rose again to 1.5 million in June 1919 and to almost 5.5 by October 1920. This 5.5 million represents the total number mobilised, but apparently half of them were placed in a reserve army and only 1.78 million drew military rations. Throughout 1921, 1922 and 1923 the size of the army fell, to stabilise at about 0.57 million in October 1923. The size of the army remained at just over half a million until 1934.

October 1920	5.498	million men mobilised
January 1 1921	4.11	million in army
May 1 1921	2.61	" "
January 1 1922	1.59	" "
January -June 1923	0.70	" "
October 1 1923	0.57	" "

Half a million men would have required at most 0.2 million tons of grain. Given the observed early wartime ratio of military use of feed and fodder we would have expected the army to need another 0.2 million

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1. See above p.85.
2. This account of the size of the army comes from J.Erikson, The Soviet High Command, pp.763-5.

tons of grain as fodder for its livestock.

In the early 1920s the army's requirements for grain were included in the grain forage balance and gave values of 1.5 million tons in 1920, 0.7 million tons in 1922 and 0.56-0.5 million tons in 1923-25. These appear to be of the correct magnitude, but some grain forage balances made allocations to the army of up to 1 million tons in the late 1920s[1]; this is difficult to reconcile with the known size of the army at that time.

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1. See p. 591.

f) lata on stock changes

In this section we are dealing with two kinds of stocks. The first kind are producers' stocks which were sometimes called peasant stocks or invisible stocks. These were the stocks of grain held by the producer. The other kind were the stocks of grain that had been transferred from the producer on to the market in some manner. These were the stocks of grain held by traders, the procurement agencies, stocks in transit and stocks held by the consumers. These were called visible stocks.

Peasant stocks or invisible stocks

The size of peasant stocks was extremely difficult to ascertain with any degree of accuracy. They depended upon the accuracy of the assessment of grain production and of its utilisation. There were a few attempts to use the budget studies to calculate the size of peasant stocks, but ultimately the question was resolved by calculating the residual once the calculated level of utilisation had been deducted from the calculated level of production.

The general procedure was for the local gub. stat. bureaux to use their own expertise in drawing up local balances and estimating the size of stocks. They would begin by assuming some normal level of stocks for the beginning of the agricultural year (July 1), e.g. 2 to 3 months extra peasant consumption. They would take some fraction of this to account for the specific conditions of the base year, they would then add on the level of production and deduct utilisation in order to arrive at the following year's invisible stock figure.

Lositsky informs us that in 1927 the central Expert Soviet was accepting the level of these local estimations with only minor changes[1]. According

1. See A.E.Lositsky, 'Krestyanskie khlebniye zapasi', SO, 1927, No.2, p.32.

to data not supplied by Lositsky, but coming from Dubenetsky's accounts of the Expert Soviet's balances several months later, the Expert Soviet had calculated the following levels of peasant visible stocks:

July 1 1925	2.68 mln.tons [1]
July 1 1926	7.21 mln.tons
July 1 1927 (planned)	10.60 mln.tons

Early in 1927 Lositsky wrote an article concerning the level of peasant stocks in one of the major statistical journals[2]. In this article he described an alternative procedure for calculating the scale of peasant stocks using the budget studies. He was very careful not to openly challenge the figures of the Expert Soviet. Lositsky explained the numerous problems involved in using the budget studies for providing an indication of the level of peasant stocks. Lositsky explained that by January 1927 only 79% of the returns had been received from the budget studies for the previous agricultural year (i.e. 1925/26). It was therefore necessary to use the results of the budget studies from 1924/25 in order to assess the level of peasant stocks in the current year (1926/27)[3]. This was clearly very unsatisfactory. Apart from this there were two other major problems. The budget studies were scheduled to provide an indication of the state of the peasant economy at the beginning of April, and not at the beginning of the agricultural year on July 1. In order to use these budget studies at all, the size of peasant utilisation for the three months April-June had to be assessed and deducted from the indicated size of peasant stocks. This was another unsatisfactory feature of the operation and Lositsky was loud in agitating for a change in procedure and

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1. See N.I.Dubenetsky, SO, 1927, no.4, p.24.
2. See A.E.Lositsky, 'Krestyanskie khlebniye zapasi', in SO, 1927, no.2.
3. See A.E.Lositsky, 'Krestyanskie khlebniye zapasi', SO, 1927, no.2, p.29.

and for some of the budgets to be scheduled for the later date. He met with some success at first in the introduction of some new specialised types of budget studies, but these were later reduced as an economy measure[1].

The third problem was the perennial problem of adjusting for the representativeness of the households covered in the budget studies. The size of peasant stocks was particularly sensitive to the socio-economic groupings of the peasant household. Lositsky stated that the data applied to the population grouped according to the results of the mass spring survey indicated a level of 17.2 mln.tons of peasant stocks. This level rose to 19.8 mln.tons when the data were corrected for errors in group distribution according to the recommendation of Professor Podtyagin in Gosplan. But if the data were adjusted to the distribution as given directly from the households covered in the budget studies, the size of peasant stocks would rise even further to 23.5 mln.tons[2].

But despite these problems Lositsky did use these data to calculate a figure of peasant stocks that was substantially lower than the figure for July 1, 1926 that been calculated by the Expert Soviet.

Lositsky began with an indication of 20.36 mln.tons of peasant stocks on April 1, 1926. This was slightly higher than the Podtyagin correction to the budget studies data. Peasant consumption for the three months April to June was assessed at one-quarter of their annual food and fodder needs and all their spring sowing needs. The level of planned and non-planned procurements were deducted and an item added to account for the receipts of grain by the agricultural population in the consumer regions. The figures are given below:

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1. See App. p.305-9.
2. See A.E.Lositsky, SO, 1927, no.2, p.30.

Peasant stocks 1/4/1926		20.36 mln.tons
Peasant utilisation 1/4-1/7/1926		
own consumption	seed	5.98
	food	5.96
	fodder	2.88
	total	14.79
sales		
Planned collections		1.31
Non-planned collections		0.59
		1.90
All utilisation		16.69
Remainder on 1/7/1926		3.67
Additional supplies to agricultural population in the Consumer regions		0.52
Final remainder		4.19

Source: See A.E.Lositsky, SO, 1927, no.2, p.32.

This was just over half of the size of peasant stocks (7.21 mln.tons) that were being accepted by the Expert Soviet at this time. Lositsky was careful to explain that his figures might be underestimated, as generous consumption allowances had been made, and because the peasants were likely to have underestimated their scale of stocks anyway. But this was probably just to avoid any charge that he was openly confronting the evaluations of the Expert Soviet.

Later the official evaluations of the Expert Soviet were changed as indicated in the following table.

	Peasant stocks in mln,tons different evaluations			Growth in peasant stocks in mln.tons		
	(1) Autumn 1926	(2) Autumn 1927	(3) Autumn 1928	(1)	(2)	(3)
July 1 1925	2.68	2.52	3.50	+4.53	+4.42	+3.12
1926	7.21	6.94	6.62	+3.39	+4.87	+2.91
1927	10.60p	11.81	9.53		+2.87	-0.79
1928		14.68p	8.74			

Sources: (1) N.I.Dubenetsky, SO, 1927, no.4, p.24. This refers to an Expert Soviet assessment of 13/10/1926.

(2) and (3) Osnovniye elementy i produktsiya sel.khoz. SSSR za 1925/26-1928/29g., M.1928, p.121 (2) refers to a speech made on 12/10/1928.
p refers to planned figure.

The level of assessed peasant stocks fell quite significantly over these years apart from the evaluations for July 1 1925. But by raising the early year evaluation, the effect was to lower the size of growth of peasant stocks indicated.

In later years once the general accounting period had been changed to calendar years, even for seasonal agricultural elements, the level of peasant stocks at the beginning of the year cannot be easily gauged from the available data. The 1928,1929 and 1930 materials to the balance of the national economy, for instance, inform us that the size of peasant stocks in the last years of the decade were as follows:

1/1/1928	32.24 million tons.
1/1/1929	34.86 million tons
1/1/1930	30.37 million tons

Source: See Materialyi po balansu Nar.khoz.za 1928,1929 i 1930gg. M.1932, pp.259-61.

These figures give an indication of the level of stocks half-way through the agricultural year, when a large proportion of the crop was still to be disposed of.

Visible stocks of grain

Visible stocks of grain were those that had passed from the producer to some form of registered intermediary in process of its distribution. That part of the grain that was consumed by the producer or sold locally and directly by him to producers with no intermediaries never entered visible stocks. But that part of the grain purchased by traders or procurement agencies and held by them or by subsequent consuming organisations was visible and was the subject of statistical accounts of visible stocks.

A proportion of visible stocks were held as inviolable reserves (neprikosnovennyi fond). They were only to be used in emergencies and their size was not reported in the normal statistical accounts of visible stocks.

The statistical accounts of all other visible stocks were centralised and reports were made on the quarter days in the year, i.e. July 1, October 1, January 1 and April 1. A fairly consistent series of these visible grain stocks is available from July 1 1923. For the early years in this series it was estimated that there was a 5-10% omission of grain stocks and these values were included by means of interpolation[1]. The reported stocks were classified according to whether they were held in store or were in transit. The data characterising the quarterly changes in visible stocks are presented in the following table and graph (see over page).

Since some of the grain was held as flour, the results have all been converted into grain equivalents in order to make the data more comparable.

The fluctuations in stocks clearly reflect the seasonal influence of the harvest. For most years the flutuations are quite regular with a trough on the eve of the harvest period (July 1) and a peak in mid-winter (January 1). The untypical nature of the fall in the level of stocks between October 1927 and January 1928 is readily visible. This was a reflection of

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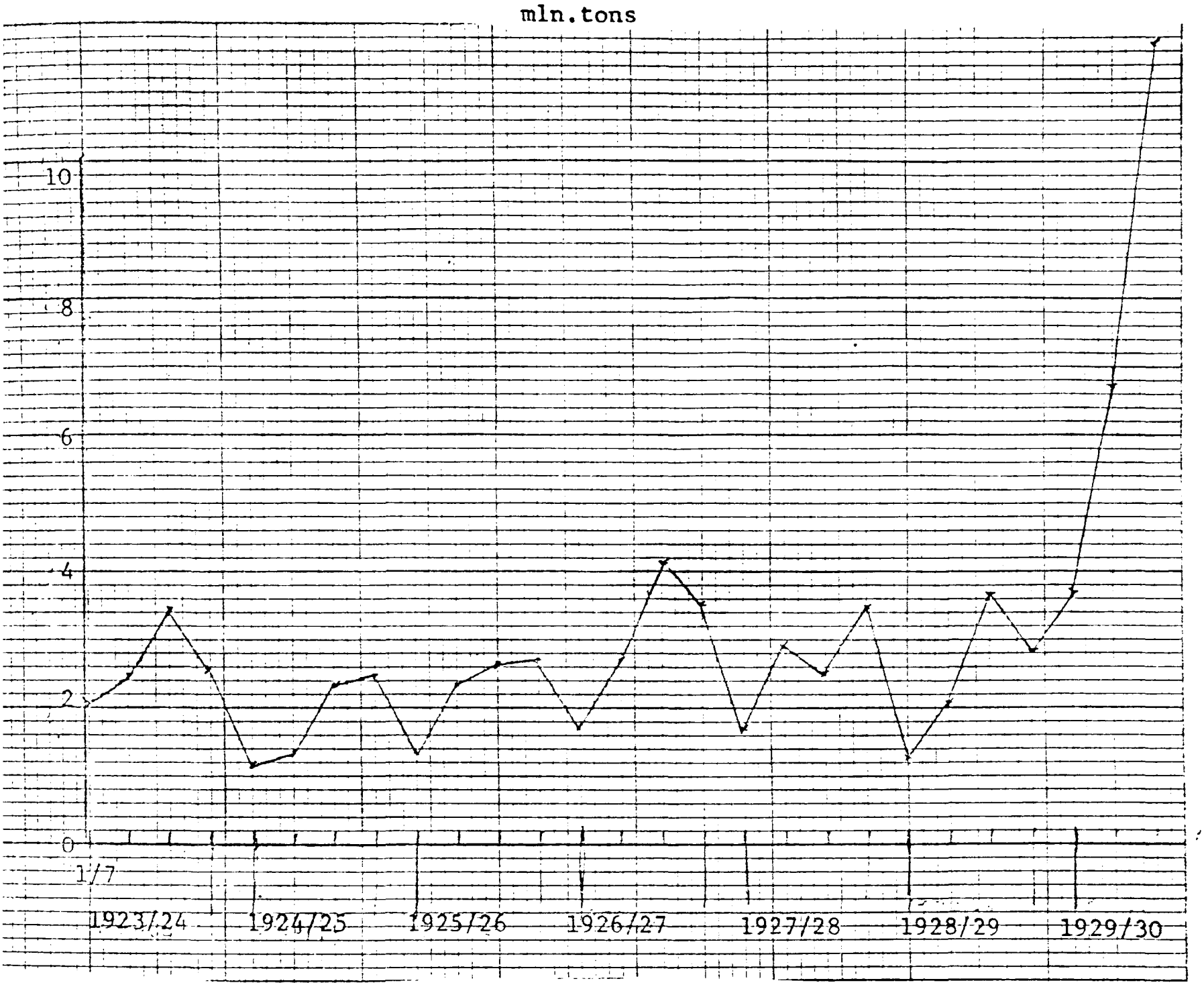
1. See Narodnoye khozyaistvo SSSR v tsifrakh, M.1925, p.569, and Statisticheskii spravochnik SSSR, 1927, M.1927, p.351 for the uncorrected and corrected data on stocks in 1923/24-1925/26.

	Visible stocks of grain in mlns. of tons				
	in stores	in transit	all	all in grain equivalents	held in industry
1923/24					
1/7/1923	1.64	0.48	2.12	2.21	
1/10/1923	1.78	0.69	2.47	2.54	
1/1/1924	2.67	0.78	3.45	3.54	
1/4/1924	1.98	0.77	2.75	2.87	
1924/25					
1/7/1924	0.92	0.36	1.29	1.35	
1/10/1924	0.98	0.38	1.36	1.42	
1/1/1925	1.77	0.60	2.37	2.51	
1/4/1925	1.53	0.93	2.45	2.48	
1925/26					
1/7/1925	0.93	0.45	1.38	1.50	
1/10/1925	1.51	0.82	2.32	2.42	
1/1/1926	1.70	0.92	2.62	2.73	
1/4/1926	1.77	0.95	2.72	2.89	
1926/27					
1/7/1926	1.22	0.53	1.74	1.86	
1/10/1926	1.77	0.93	2.69	2.83	
1/1/1927	3.22	0.92	4.15	4.38	
1/4/1927	2.66	0.93	3.54	3.76	
1927/28					
1/7/1927	1.25	0.48	1.73	1.86	
1/10/1927	2.14	0.76	2.90	3.01	0.11
1/1/1928	2.00	0.53	2.53	2.70	0.16
1/4/1928	2.61	0.88	3.49	3.72	0.18
1928/29					
1/7/1928	1.10	0.29	1.32	1.53	0.58
1/10/1928	1.50	0.55	2.04	2.12	0.79
1/1/1929	2.86	0.75	3.62	3.76	1.40
1/4/1929	2.36	0.47	2.83		
1929/30					
1/7/1929	2.77	0.96	3.76		
1/10/1929	4.22	2.54	6.76		
1/1/1930	7.68	4.08	11.76		

Sources: 1/7/1923 - 1/1/1929 in Statisticheskii spravochnik SSSR 1928, M.1929, pp.478-81.
1/4/1929 SO,1929, no.12, p.105.
1/7/1929 SO 1929, no.12, p.104
1/10/1929 SO'1930 no.2, p.106.
1/1/1930 SO,1930, no.5, p.149.

The seasonal dynamic of visible stocks of grain in mln.tons



the poor progress of the 1927/28 procurements campaign and was the signal that persuaded Stalin that some extraordinary measures were required to remedy the situation. The 1928/29 dynamic also indicates the pressure that was applied in order to increase the level of stocks in the summer of 1929 when they would normally have fallen. The 1929/30 figures indicate the remarkable growth in visible stocks that served as the background to the collectivisation campaign.

The stocks were classified according to the type of owner. The major

classifications are given below:

1. Stocks of state administrative organs. This group included the stocks of NKProd and so were very large. After the abolition of NKProd in 1924 only a few local state organs were included in this group.
2. Stocks of state grain traders. This group is dominated by the major state grain trading organs Khleboprodukt and Soyuzkhleb after the major 1928 reorganisation of the grain trade.
3. Stocks of consumer cooperatives. This included the central agency Tsentrosoyuz as well as the specialist agencies of Khlebotsentr and Selgospodar in the Ukraine.
4. The stocks of the agricultural cooperatives.
5. Private traders.
6. Industrial stocks.
7. Stocks of seed held by NKZem.

The changing relative importance of these groups is indicated in the following table: (see over page)

This table indicates the growing importance of the state grain traders and of the consumer cooperatives in the share of stocks held.

Much more detailed figures are available on that part of the visible stocks that was held by the so-called central planned collectors. This group includes the state collection agencies and the major centralised cooperative collecting agencies. Detailed data on the activities of these centrally planned collectors were published annually in the grain trade year books[1] by the central convention bureau of grain traders and

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1. Initially entitled Ezhegodnik khlebnoi torgovly , the title was changed to Ezhegodnik khlebooborata with the third and subsequent issues after 1931. The concept of trade was being questioned at the time and commodity turnover was politically safer.

The dynamic of changes in visible grain stocks according to type of owner of stocks

	State organs		Cooperatives		Private	Industry	Seed	All	in transit	Total
	1	2	3	4	5	6	7			
1923/24										
1/7/1923	0.93	0.33	0.17	0.02	0.05	0.15		1.64	0.48	2.13
1/10/1923	0.71	0.62	0.23	0.03	0.08	0.10	-	1.78	0.69	2.48
1/1/1924	1.16	0.75	0.34	0.06	0.09	0.15	0.12	2.68	0.78	3.45
1/4/1924	0.57	0.77	0.30	0.07	0.11	0.14	0.02	1.98	0.77	2.75
1924/25										
1/7/1924	0.09	0.52	0.21	0.02	0.06	0.08	0.02	0.99	0.34	1.33
1/10/1924	0.03	0.47	0.19	0.04	0.06	0.15	0.08	1.02	0.36	1.38
1/1/1925	0.04	1.04	0.36	0.06	0.06	0.13	0.14	1.83	0.56	2.40
1/4/1925	0.03	0.91	0.29	0.02	0.05	0.09	0.15	1.54	0.93	2.47
1925/26										
1/7/1925	0.02	0.63	0.17	-	0.04	0.08	-	0.94		
1/10/1925	0.02	1.00	0.27	0.10	0.09	0.19	0.01	1.71		
1/1/1926	0.04	1.04	0.41	0.10	0.10	0.08	0.02	1.84		
1/4/1926	0.03	1.12	0.43	0.06	0.08	0.10	0.02	1.91		
1926/27										
1/7/1926	0.02	0.71	0.35	0.03	0.08	0.09	0.02	1.31		
1/10/1926	0.03	1.07	0.44	0.17	0.08	0.08	0.07	1.98		
1929/30										
1/4/1929	0.01	1.03	0.56	0.30	0.014	0.18	0.28	2.36		
1/10/1929	0.01	1.81	0.77	1.14	0.009	0.23	0.27	4.22		
1/1/1930	0.02	3.68	1.41	1.21	0.005	0.54	0.77	7.68		

Source: 1/7/1923-1/4/1925. Abrégé des données statistiques de l'URSS M.1925, p.169.

1/4/1925-1/10/1926 Statisticheskii spravochnik SSSR 1927, M.1927, p.351.

1/4/1929 SO. 1929, no.12, p.105.

1/10/1929 SO. 1930, no.2, p.106.

1/1/1930 SO, 1930, no.5, p.149.

by the People's Commissariat of Supply (NKSnab) after 1929.

A series of monthly data on the level of stocks held by these planned procurement agencies from this source is given below and in the following graph:

Visible grain stocks held by planned procurement agencies in mln.tons

	1924/25	1925/26	1926/27	1927/28	1928/29	1929/30
July 1	0.38	0.72	0.84	0.77	0.49	0.78
August 1	0.24	0.54	0.66	0.62	0.37	0.72
September 1	0.38	0.81	0.86	1.13	0.52	2.07
October 1	0.52	0.16	0.39	1.50**	1.08	4.46
November 1	0.74	1.21	1.82	1.56	1.73	7.07
December 1	0.94	1.22	2.15	1.33*	1.75	7.88
January 1	1.27	1.28	2.54	1.21	1.53	7.83
February 1	1.29	1.32	7.48	1.43	1.17	7.14
March 1	1.14	1.44	2.30	1.89	1.19	6.19
April 1	1.02	1.41	1.93	1.72	1.21	5.08
May 1	1.00	1.20	1.59	1.16	0.84	3.50
June 1	0.92	1.05	1.11	0.73	0.56	3.05

Source: Ezhegodnik khlebooborata No.4-5, za 1929/30 i 1930/31gg., M.1932, chast 2, p.127.

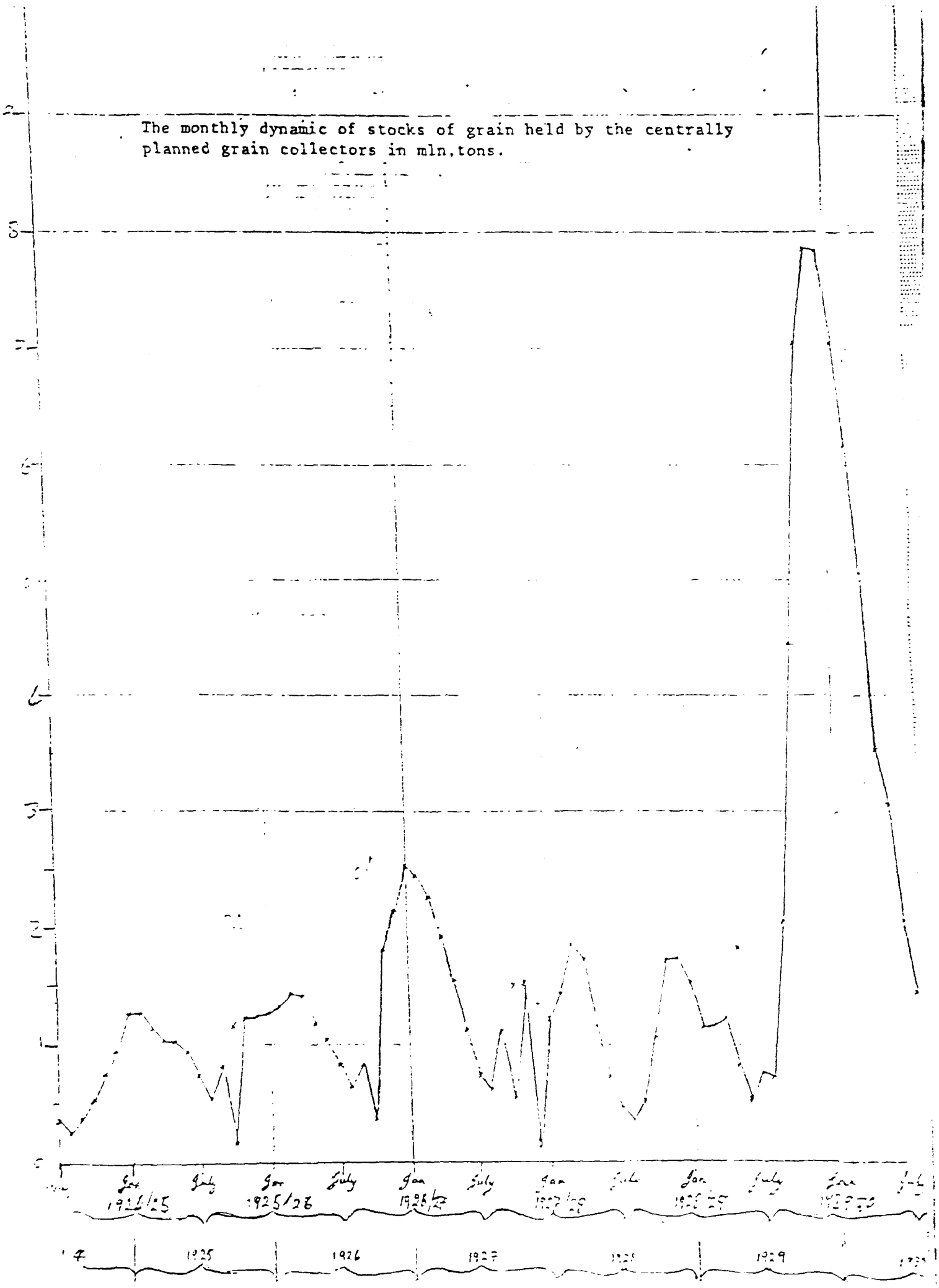
Note: data exclude grain in transit

* misprint in original gave 0.13 mln.tons. This would have been really desparate.

** misprint in original gave 0.56 mln.tons.

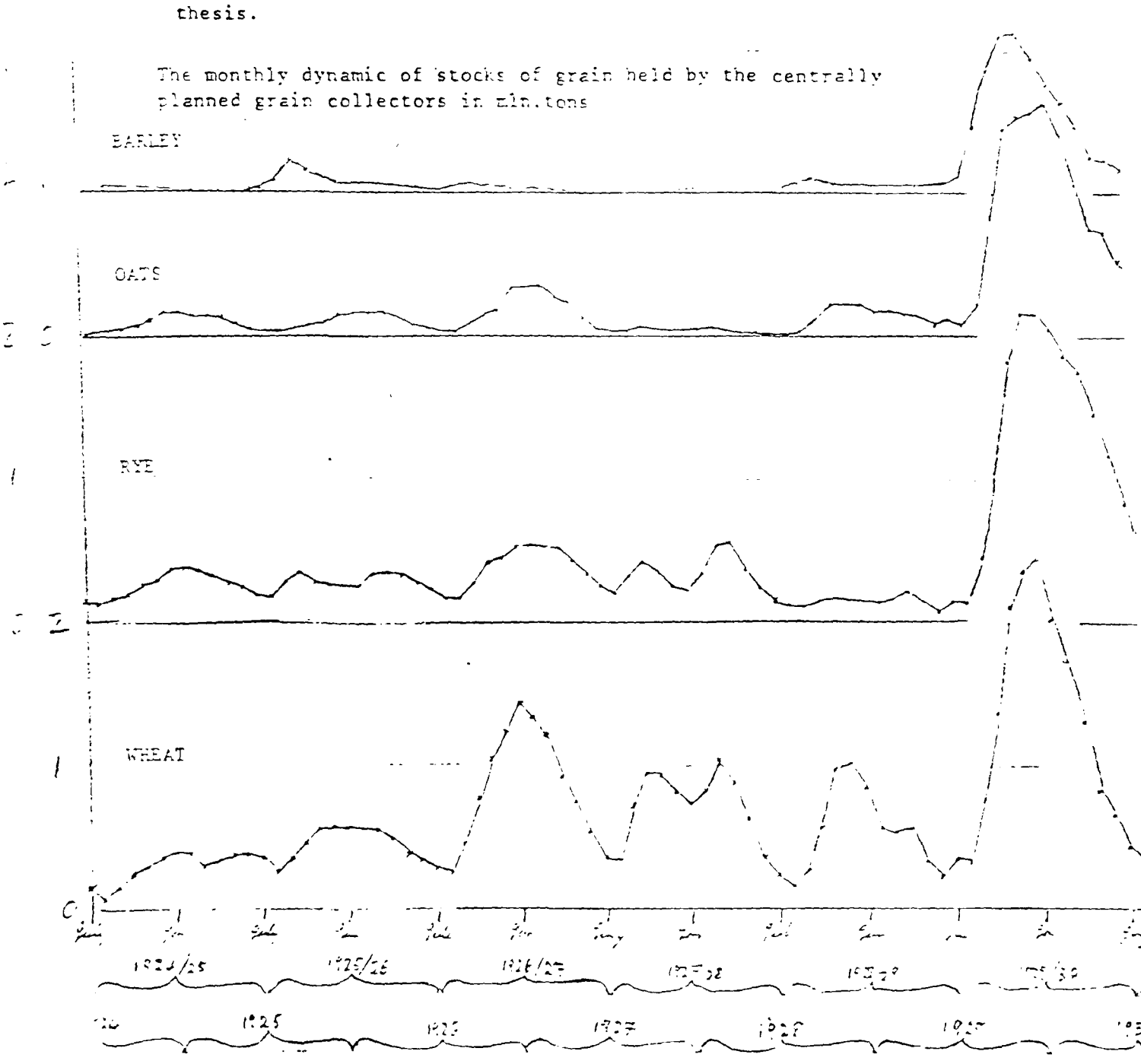
These figures again indicate well the severity of the autumn 1927/28 reversal of the normal seasonal pattern in the movement of stocks and the dramatic increases in the 1929/30 level of stocks.

An indication of the level of stocks for the 4 major grains is provided in the following graphs based on data from the same source.


The monthly dynamic of stocks of grain held by the centrally planned grain collectors in mln.tons.
Jan 1924/25
July
Jan 1925/26
July
Jan 1926/27
July
Jan 1927/28
July
Jan 1928/29
July
1924
1925
1926
1927
1928
1929

These graphs indicate the predominant importance of wheat and rye stocks in the early years, and the very large increase in oats and barley stocks in 1929/30 when the wheat and rye stocks increased so dramatically.

The volumes of statistics related to these central procurement agencies are immense, but cannot be dealt with in any more detail in this thesis.



g) Grain exports

The statistics on grain exports are the one branch of statistics which have been systematically and fairly comprehensively reworked and published. The data were initially collected by the statistics department of the chief administration for customs of the People Commissariat for Trade/External Trade. These data, available on an annual basis with a fairly detailed breakdown according to type of grain, have been published in a series of volumes by the Ministry of External Trade[1].

It is unfortunate that the grouping of these data obscures the nature of the exports and imports associated with the 1928 harvest. The figures for 1927/28 are mainly dominated by the 1927 harvest conditions and those for 1928/29 by those for the 1929 harvest. I have therefore supplemented the official series with figures from other sources which enable us to see better the characteristics of the exports and imports of grain in these years.

The following tables provide a listing of these data: (see tables over page).

It will be readily seen that the post-revolutionary level of exports was far below the pre-war level, only reaching 29% of the 1913 level in the peak export year of 1923/24. In most years it was well below even this meagre level. Only in three years did exports exceed 1 million tons: 1923/24 - 2.5 million, 1925/26 - 2 million and 1926/27 - 2.1 million. In 1921/22, 1924/25 (if flour imports are included) and in the important year initially missing from these data 1928/29, imports exceeded exports.

1. The first comprehensive volume of foreign trade statistics was published by the customs department in 1931 and contained detailed data for the period 1918-1921 on a calendar year basis and 1921/22-1927/28 economic year basis (October-September). A second volume covering the 3 months October to December 1928 and the calendar years 1929-1932 were published in 1933. Subsequently these data have re-appeared in Vneshnaya torgovlya SSSR za 1918-1940gg. Statisticheskii obzor, M.1960. The last volume also contains a listing of the 1913 exports and in a comparable classification. The 1913 data refer to the foreign trade of all the Russian Empire with the exclusion of Finland only.

Grain and grain produce foreign trade 1913-1929 in mln.tons

	All grains	Wheat	Rye	All food grains	Bar-ley	Oats	Other	Flour	Bran	Beans
Exports										
1913	9.181	3.329	0.647	3.98	3.927	0.600	0.676	0.310	0.839	0.752
1918	0.002	0.001	-	-	-	0.001	-	0.001		
1919	-	-	-	-	-	-	-	-	-	-
1920	0.004	0.001	-	-	0.002	-	0.001	-	-	-
1921	-	-	-	-	-	-	-	0.001	-	-
1921/22	-	-	-	-	-	-	-	-	-	-
1922/23	0.728	0.027	0.518	0.55	0.089	0.067	0.003	0.010	0.038	
1923/24	2.576	0.555	1.316	1.87	0.327	0.139	0.240	0.034	0.018	0.127
1924/25	0.569	0.167	0.072	0.24	0.199	0.003	0.127	0.001	0.004	0.057
1925/26	2.016	0.737	0.158	0.89	0.836	0.023	0.262	0.013	0.003	0.100
1926/27	2.099	1.199	0.417	1.62	0.262	0.066	0.155	0.014	0.065	0.156
1927/28	0.289	0.111	0.115	0.13	0.005	0.037	0.021	0.022	0.032	0.110
1928/29	0.003	0.003	-	-	-	-	-	0.001	?	0.077
1929/30	1.164	0.239	0.203	0.442	0.633	0.056	0.033	?	?	0.059
1928	0.014	0.003	0.010	0.01	-	-	0.001	0.022	0.022	0.068
1929	0.178	-	0.001	-	0.159	0.008	0.010	0.013	-	0.082
Imports										
1913	0.466	0.130	0.197	0.33	0.024	0.038	0.048	0.110	0	0.008
1918	-	-	-	-	-	-	-	-	-	-
1919	-	-	-	-	-	-	-	-	-	-
1920	-	-	-	-	-	-	-	-	-	0.001
1921	0.142	0.081	0.058	0.14	-	0.002	-	0.086	-	0.023
1921/22	0.583	0.251	0.190	0.44	0.021	0.028	0.080	0.243	-	0.008
1922/23	0.013	0.004	0.006	0.01	-	0.003	-	0.024	-	-
1923/24	0.041	0.008	-	0.01	-	-	0.031	0.014	-	0.001
1924/25	0.281	0.073	0.166	0.24	0.005	0.003	0.029	0.373	-	0.001
1925/26	0.032	0.003	-	-	0.001	-	0.028	0.028	-	-
1926/27	0.044	0.001	-	-	-	-	0.043	0.016	-	0.001
1927/28	0.277	0.245	-	0.25	0.001	-	0.031	0.031	-	0.003
1928/29	0.263	0.263	-	0.263	-	-	0.004	0.004	-	-
1929/30	-	-	-	-	-	-	-	-	-	-
1928	0.271	0.245	-	-	-	-	-	-	-	-
1929	0.046	0.021	-	0.21	-	-	0.016	0.040	-	0.001

Export of grain and grain produce net of imports in mln. tons:

	All grains	Wheat	Rye	All food grains	Barley	Oats	Other	Flour	Bran	Beans
Net Exports										
1913	8.716	3.190	0.450	3.64	3.903	0.562	0.628	0.262	0.839	0.744
1918	0.007	0.001	-	-	-	0.001	-	-	-	-
1919	-	-	-	-	-	-	-	-	-	-
1920	0.004	0.001	-	-	0.002	-	0.001	-	-	-
1921	-0.147	-0.081	-0.050	-0.14	-	-0.002	-	0.085	-	0.023
1921/22	-0.583	-0.251	-0.190	-0.44	-0.021	-0.028	-0.080	-0.243	-	0.008
1922/23	0.715	0.023	0.512	0.54	0.089	0.024	0.067	-0.024	0.010	0.038
1923/24	2.535	0.547	1.316	1.86	0.327	0.139	0.209	0.020	0.018	0.126
1924/25	0.288	0.094	-0.094	0	0.194	-0.002	0.098	-0.368	0.004	0.057
1925/26	1.984	0.734	0.158	0.89	0.835	0.023	0.234	-0.015	0.003	0.100
1926/27	2.055	1.198	0.417	1.62	0.262	0.066	0.112	-0.002	0.065	0.155
1927/28	0.012	0.134	0.115	0.019	0.004	-0.037	-0.016	-0.009	0.032	0.107
1928/29	-0.260	-0.260	-	-0.260	-	-	-0.004	-0.003	-	
1929/30*	1.164	0.239	0.203	0.442	0.633	0.056	0.033			0.059
1928	-0.257	-0.242	-	-0.242	-	-	-0.026	-0.035	-	-
1929	0.132	-0.021	0.001	-0.020	0.159	0.008	-0.005	-0.024	0.008	-

* Note 1929/30 figure does not include imports.

Sources for table on grain and grain produce foreign trade 1913-1929.

1913,1918-21, 1921/27-27/28 and 1929 from Vneshnaya torgovlya SSSR za 1918-1940gg.,M.1960, pp.45-117.

1928/29 from Ezhegodnik khlebooborata No.3 za 1928/29, M.1931, p.35

1929/30 from Ezhegodnik khlebooborata No.4-5 za 1929/30 i 1930/31, M.1932, p.145

1928 exports from Narodnoye khozyaistvo SSSR, M.1932, p.390

1928 imports from Materialy po balansu narodnogo khozyaistvo za 1928, 1929 i 1930gg., M.1932, p.259.

Notes: 1913 refers to area of Tsarist Empire less Finland only (i.e. it includes Poland and the Baltic States).

'All grains' in this table excludes flour bran and beans. The data as given in Nar.khoz.SSSR, M.1932 and in the Ezhegodniki all grouped beans together with the grains. But the Ministry of External Affairs gave them a separate classification and grouped them together with processed grains. I have decided to keep them separate to avoid confusion. The Ezhegodnik khlebooborata also included data on otgruzka to ports, i.e. transportation of grain to ports. These data have been used by me in the transportation section below, but they do differ slightly from the figures for actually exported grain.

Of the three good export years, the first, 1923/24 was dominated by Rye exports (1.32 million tons - over half of all the 2.58 million tons of grain exported). The second 1925/26 was dominated by Barley exports (over 40%, 0.84 million tons out of 2.02 million) and the third was dominated by Wheat exports (1.2 million our of 2.1 million tons).

Most of the imports were food grains and flour.

I will discuss the region of origin of imported grain in the later section on transportation data[1].

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1. See above, p.582.

h) Data on grain losses

There is little that can be said on this subject other than to repeat what was said in the similar section to this in the first part of this thesis. There w little or no direct data on the scale of losses and so the scale of losses could only be derived as a residual. The scale of losses was greatly dependent on the concepts of grain used and the measurements used. As we have seen in the earlier sections, the budget studies and control measurements of the level of grain yield had begun to include 'ozadki' and other waste elements in their evaluation of grain yields and also appear to have moved very close to adopting a sort of biological indication of the yield level. The measurement of grain had consequently become much wider and would inevitably lead to a larger appearance of wastage in the utilisation balances. Non-existent grain has to be wasted because it cannot be used[1]. And a large element of 'other' utilisation appeared in the Expert Soviet balances in the late 1920s to lose part of this non-existent grain.

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1. This is a very tricky topic, and ultimately it might of course be claimed that non-existent grain was being consumed by someone. Much of the rural politics of the early 1930s appears to be concerned with the division of non-existent grain. But this required violence to enforce it. In the late 1920s it was easier to waste non-existent grain than to claim that someone was using it.

i) Transportation data

After the revolution the transport statistics were much better organised than they had been earlier. The nationalisation of the railways and the wartime attempts at planning transportation had led to a centralised and fairly efficient system of administrative accounting. A Central Department of Statistics and Cartography was set up under the People's Commissariat for Communications (TsSK(NKPS)) to manage the administrative statistics for the railways. TsSK(NKPS) had its own local departments in all localities. There was initially much conflict over the role of these departments as the local railway administrators were reluctant to let them interfere with their operational activities. But after the publication of many decrees on this matter and the exertion of much pressure, TsSK(NKPS) was able to exert itself over local accounting procedure and ensure that good and detailed accounts of goods transportation were kept[1]. These accounts of TsSK(NKPS) serve as the basis for the transportation data that we will be considering.

Other so-called conjunctural commodity transport statistics were collected on the basis of the registration of the 30 most common commodities passing through a number of census stations. The goods were measured in wagon loads. These statistics were organised by I.A.Poplavsky's department in TsSU. They covered only about 60-70% of the transported goods but they did allow monthly indications to be available about 15 or 20 days after the end of the month. Nekrash however claims that their results were highly dubious and that the full accounting data should be used wherever possible.[2]

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1. See L.V.Nekrash, 'Statistika Transporta', in V.E.Den & B.I.Karpenko (eds.), Khozyaistvennaya Statistika SSSR, L.1930, pp.281-85.

2. L.V.Nekrash, ibid., p.283

The data for river transportation were far less satisfactory because of the multiplicity of different agencies and lack of centralised controls. Each different administration concerned with waterways transportation was instructed to send accounting data to the local statistical departments of the administration for internal waterways under the NKPS. But their quality and comprehensibility was much lower than the railways transport data. Road haulage was the most difficult to assess. There were no documentary accounts for road haulage. Data were collected from records kept at a series of investigation points located on the main highways. These points were not permanently manned and were only intended to give an indication of the scale of transportation.

Grain transported by rail and waterways in mln.tons.

	rail	waterways	all
1913	18,9	5.9	24.8
1923	8.8	0.7	9.5
1924	10.1	0.9	11.0
1925	10.5	1.2	11.7
1926	14.2	1.2	15.6
1927		1.3	
1928	16.5[a]/15.5[b]	1.4	17.8[a]/16.7[b]
1929	19.9[a]/19.2[b]	2.0	21.9[a]/21.2[b]
1922/23	8.9		
1923/24	10.5		
1924/25	11.5		
1925/26	14.6		
1926/27	16.1	1.0	17.6
1927/28	14.7	1.1	16.3
1928/29			16.0
1929/30			

Sources: 1913,1923-26 Stat.Spravochnik SSSR, 1927, M.1927, pp.404-61
1928-29 a) Nar.Khoz.SSSR,1932, M.1932, pp.206,216-7,229.
1928-29 b) Sots.stroi SSSR,M.1935, pp.260-1.

Note: The reason for the difference between a) and b) appears to be the exclusion of buckwheat and millet from b).

Sources cont'd: 1922/23-26/27 rail, I.Poplavski SO, 1928, No.10 p.73.

1926/27 - 1927/28, G.Vasilyev, SO, 1928, No.8, p.70.

1927/28 and 1928/29, G.Vasilyev, SO 1929, No.9, p.83.

The waterways in particular appear to have been carrying a much smaller amount of grain than before the war and in fact less grain than they had handled in the middle of the nineteenth century[1]. This was mainly a consequence of the sorry plight of the Volga regions in the CPR.

The distance that this smaller amount of grain was transported was much larger than before the war. The 1913 average distance of rail transportation was higher than the distance for earlier years but still only just reached 544 kilometres. The average distance in 1925 was 949 kilometres, and in 1929 843 kilometres. This was partly the consequence of the increase in importance of the EPR and partly due to Southern grain moving northwards instead of being exported.

An indication of the regional transport balances is given in the following tables: (see over page).

We see that the NCR and SCR were receiving more grain per year in the late 1920s than they had done at their pre-revolutionary peaks, but that the amount of grain despatched from the two major producer regions was considerably less than it had been before the war. The EPR however was despatching far more grain than it had ever done before.

After the disastrously low level of grain shipments into the NCR during war communism and the early years of NEP, the 1913 level of net grain receipts into this region was already reached by 1925/26. After a slight fall in receipts in 1926/27, the following year saw the pre-war level of net receipts into this region exceeded by 9%, over a quarter of a million tons. 1928/29 saw a fall by almost three-quarters of a million tons but the

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1. See p.179.

Regional grain transport balances (Despatches net of receipts) in mln.tons

Balance including foreign trade

	NCR	SCR	SPR	CPR	EPR	USSR
1901	-2.85	+0.18*	+4.63	+2.31	+0.20	+4.48
1913	-4.33	+1.33	+8.25	+3.33	+0.76	+9.30
1920	-1.75	+0.08*	+0.09	+0.29	+0.29	-0.49
1921	-0.91	+0.05*	+0.04	-0.03	+0.12	-0.72
1922	-1.29	+0.12*	+0.76	-0.20	+0.29	-0.80
1913	-3.91	-0.54	+8.69	+4.94	+0.78	+9.97
1922/23	-1.52	-0.18	+1.38	+0.87	+0.90	+0.58
1923/24	-2.25	-0.15	+3.84	+1.03	+0.19	+2.66
1924/25	-2.48	-0.35	+1.66	+0.24	+1.52	+0.64
1925/26	-3.96	-0.78	+4.82	+0.87	+1.11	+2.06
1926/27	-3.76	-0.71	+3.32	+2.08	+1.73	+2.66
1927/28	(-4.25)	(-0.92)	(+2.94)	(+1.73)	(+1.08)	(+0.60)
1928/29	(-3.58)	(-0.78)	(+0.51)	(+0.51)	(+1.99)	(+0.29)
1929/30	-4.02	-1.03	+3.68	+2.15	+0.15	+0.99

Balance excluding foreign trade

	NCR	SCR	SPR	CPR	EPR	USSR
1901	-2.98	-0.47	+2.13	+2.31	+0.20	+1.18
1913	-4.82	+0.35	+1.36	+3.33	+0.90	+1.08
1920	-1.10	+0.09	+0.09	+0.29	+0.29	-0.34
1921	-0.68	+0.05	+0.05	-0.03	+0.12	-0.49
1922	-0.82	+0.26	+0.88	-0.20	+0.29	-0.06
1913	(-3.41)	(+0.46)	(+1.29)	(+4.94)	(+0.78)	(+1.1)
1922/23	(-1.57	(-0.18)	(+0.68)	(+0.87)	(+0.90)	(-0.12)
1923/24	(-2.25)	(-0.15)	(+1.34)	(+1.03)	(+0.19)	(+0.16)
1924/25	(-2.48)	(-0.35)	(+1.46)	(+0.28)	(+1.52)	(+0.43)
1925/26	(-3.96)	(-0.78)	(+2.76)	(+0.74)	(+1.05)	(-0.15)
1926/27	(-3.77)	(-0.71)	(+1.65)	(+1.81)	(+1.19)	(+0.17)
1927/28	-4.26	-0.92	+2.54	+1.64	+1.07	-0.07
1928/29	-3.58	-0.78	+0.47	+1.95	+2.15	0.21
1929/30	(-4.19)	(-1.03)	(+2.72)	(+1.95)	(+0.14)	(-0.35)

Grain Exports by region

	NCR	SCR	SPR	CPR	EPR	USSR
1901	0.13	0.65	2.50	0	0	3.30
1913	0.49	0.98	6.89	0	-0.14	8.22
1920	-0.15	-0.01	0	0	0	-0.15
1921	-0.23	0	-0.01	0	0	-0.38
1922	-0.47	-0.14	-0.12	0	0	-0.74
1913	(0.5)	(1.0)	(7.4)	(0)	(0)	(8.9)
1922/23	(0)	(0)	(0.7)	(0)	(0)	(0.7)
1923/24	(0)	(0)	(2.5)	(0)	(0)	(2.5)
1924/25	(0)	0	0.20	0.01	0	0.21
1925/26	0.01	0	2.06	0.13	0.06	2.21
1926/27	0.01	0	1.67	0.27	0.54	2.49
1927/28	0.01	0	0.40	0.09	0.01	0.53
1928/29	0	0	0.04	0.04	0	0.08
1929/30	0.17	0	0.96	0.20	0.01	1.34

Source: See appendix

Notes: * The reason for the large balance in the SCR appears to be due to the inclusion of parts of the North Caucasus into the region of Caucasus used in this early compilation.

1929/30 level was again well above the pre-war level.

In the SCR the change was even more dramatic. The 1925/26 level of net receipts was already over 32% higher than the pre-war level, and it stayed above the pre-war level thereafter. By 1929/30 75% more grain was being transferred into this region than had been transferred there before the war. This was largely due to the conscious decision to expand the production of cotton and to lessen the need to import cotton from abroad. But it should be remembered that even before the war the net receipts of the SCR accounted for 13% of all the net receipts of grain from the two consumer regions (the NCR and SCR). From 1925 the share of the SCR remained above 20%.

In comparison with these increases in net receipts of grain in the two consumer regions, the two main producer regions despatched far less grain than earlier. The SPR only managed to despatch 55% of its 1913 level of net grain despatched in its post-revolutionary peak year of 1925/26, and for most years it was significantly lower than this. The CPR never managed to achieve more than 43% of its 1913 level and most years it was significantly lower than this.

The only region which managed to despatch far more grain than it did before the war was the EPR. In 1922/23 it already despatched 15% more grain than it had done before the war, by 1924/25 it was despatching almost twice as much (1.52 mln.tons), which was almost as much grain as was coming out of the SPR, and by 1928/29 the EPR despatched more grain than any other region. The despatches for the final year we are considering, 1929/30, were however much smaller.

It could be argued that these dramatic changes are only illusory because 1913 was a very untypical year with a record harvest, but I think that in general they do represent real changes. The 1909/13 figures given by Groman do not present a pre-war picture very different to that

given by the 1913 indicator cited in the table above[1].

As regards the supplies of grain transported to the major cities in the NCR, a Soviet statistician, Koporskii, writing in the statistical journal of TsSU (RSFSR) in 1928 presented some interesting data[2]. Koporskii's data covered food grains transported by rail and waterways to the 18 main cities of the NCR from 1900/01, 1912/13 in comparison with 1924/25. These data are summarised in the following table:

Food grains supplied by rail and river to the 16 major northern cities, in mln.tons.

	1900/01	1912/13	1924/25	1925/26	1926/27
Rye grain	0.150	0.114	0.134	0.228	0.124
flour	0.402	0.395	0.054	0.173	0.173
All Rye in flour equivalents	0.529	0.492	0.168	0.367	0.348
Wheat grain	0.073	0.054	0.063	0.087	0.188
flour	0.332	0.414	0.273	0.530	0.531
All wheat in flour equivalents	0.355	0.458	0.327	0.603	0.666
All food grains in flour equivalents	0.88	0.95	0.50	0.97	1.01

Source: A.Koporskii, SiNKh, 1928, no.3, p.47.

% of Rye	60.1%	51.8%	33.6%	37.8%	34.5%
% of flour	83.4%	85.2%	65.4%	72.5%	69.7%

1. See p.182 for a discussion of Groman's 1909/13 transportation data. In general these data have not been used for comparative purposes in this section because, first, their regionalisation is not comparable to that for the 1920s data, and, secondly, they refer to the four main grains only.
2. See A.Koporskii, 'Snabzheniye gorodov potreblyayushchyei polosyi Evropyeiskoi Rossii khlebami do voinyi 1914g. i v nastoyashchyi vremya', SiNKh, 1928, no. 3, pp.46-60.

These data indicate a picture for the supplies to these northern cities very similar to the one given in the tables above for supplies of grain into the NCR as a whole. There are however a few interesting differences and a few more detailed points that emerge. First, we see that the growth in supplies to these towns from 1900-1913 was much slower than the growth for the supplies to the NCR as a whole over this period. By 1925/26 the level of grain transported to the northern cities was just exceeding the amount transported there in 1912/13, just as the data for all the NCR indicated that the 1925/26 level was higher. But whereas there was a decline in supplies to the NCR as a whole in 1926/27, the supplies to these cities were reported by Koporskii to have increased. Unfortunately, no data are available for the supplies to these cities for the later period. But we would expect that they would tend to be relatively better cushioned against supply problems than were the other settlements in the NCR. Priority was given to food supplies to the consumer regions as a whole and within the consumer regions particular attention was paid to the supplies to the major cities.

The Koporskii data also present an interesting indication of the changing importance of the two grains and of flour and grain. We see a sharp increase in the amount of wheat transported into these regions and a decrease in the proportion of flour. Both these phenomena are probably associated with the declining importance of the ailing Volga regions. The Volga regions had been the main suppliers of rye to the northern cities before the war and the Volga millers ground much of this grain before it was transported. The private mills had been nationalised during the Revolution, but with the famine and general depression in the Volga area in the early 1920s, the large Volga mills never appear to have regained their earlier importance.

These changes could also have been partly a consequence of changing tastes, increased affluence and increased caution. Concerning the latter point it should be noted that in times of uncertainty it was probably felt advisable to keep the grain in a form in which it could be easily stored. Once the grain had been milled it would be more difficult to store it if there were any delays in distribution.

The following table presents an indication of the general overall changes in the quantities of different grains transported by rail in this period:

(mlns. tons)

	1913	1922 /23	1923 /24	1924 /25	1925 /26	1926 /27	1927 /28	1928	1929
Rye	1.27	3.65	3.38	1.85	1.64	2.00	2.07	1.77	2.47
Wheat	5.68	1.01	1.67	2.39	3.93	4.97	4.29	4.58	4.45
Oats	2.15	1.00	0.92	1.04	1.29	1.71	1.31	1.81	3.38
Barley	2.01	0.36	0.41	0.55	0.88	0.32	0.22	0.50	1.63
Other Grains	3.45	1.35	1.72	2.42	3.45	2.64	1.90	3.02	2.92
Flour	4.32	1.56	2.27	3.21	3.71	4,42	4.87	4.84	4.83
Rye	1.11	0.75	0.85	1.01	1.16	1.40	1.47	1.61	1.38
Wheat	3.21	0.81	1.42	2.20	2.55	3.02	3.40	3.21	3.45
All	18.88	8.94	10.37	11.52	14.93	16.09	14.69	16.49	19.86

Sources: 1913, 1922/23-25/26, I.Poplavskii, 'Dinamika gruzooborata glavnyeishikh tovarov', SO, 1927, No.2, p.87.
1926/27 and 1927/28, G.Vasilyev, 'Khlebniye perevozki (1922/23-1927/28gg. i 1913g)', SO, 1928, no.8, p.70.
1928 and 1929, Sotzialisticheskoe stroitelstvo SSSR, M.1935, pp.260-1.
1928 and 1929, Narodnoye khozyaistvo SSSR, M.1932, p.205.

Note: slightly lower figures appear in Sotz.stroi.SSSR, M.1935, p.260-1, due to the exclusion of buckwheat and millet.

These figures indicate that for the country as a whole rye comprised a much larger share of all grain transported than before the war and barley and wheat had a much smaller share. These changes were a direct consequence of the decline in exports and an increase in orientation on the domestic market.

6. Grain utilisation balances 1918-29

In this period we are literally flooded with grain utilisation balances. The grain problem was one of the most fundamental economic and political problems of the time. The balances provided a detailed indication of what the problem was, and thereby provided the basis for any attempts to overcome the problem. There were several different types of grain utilisation balances. There were preliminary balances which were in effect plans based on expected production levels, expected consumption norms, planned collections, transportation and exports. There were final executed balances (historical balances or accounting balances), which were based on indications of the actual level of production, the recorded level of consumption in the given year, the registered level of exports, transportation etc. And in between these there were several other types of balance when the production level was known, but the utilisation patterns had not yet been finally settled. To some extent all balances were bound to be preliminary until the end of the accounting year. However in general usage, the term final balance often referred to a balance drawn up after the final harvest reports had been made. In order to ease clarification and consistency I will refer to balances drawn up after the final harvest evaluation but before all the utilisation data were available as final preliminary balances. Balances drawn up after all utilisation data had become available will be called final accounting balances.

In the pre-revolutionary period all of the balances that were mentioned were final accounting balances, with the exception of Lositsky's balance for 1917 which was a final preliminary balance. In the 1920s we will be discussing both preliminary and accounting balances.

The preliminary balances were the operationally significant balances that were used to orientate grain collectors, planners and policy makers. The final accounting balances could serve little direct operational significance. They were however important for setting the overall scale of the preliminary balances, for setting the norms used in the preliminary balances and in checking the reliability of the preliminary balances.

The historian needs to look at the final accounting balances in order to get what was considered to be the best representation of the grain balance. But he needs also to look at the preliminary balances to see the context in which economic policy on the grain front was being pursued.

Within the balances the utilisation items can be divided between the basic items and the conjunctural items. The basic items have to be satisfied whatever the conditions of production and the level of utilisation is somewhat inelastic to changing levels of production. The most inelastic of these basic items are seed utilisation and food utilisation. The level of livestock feed consumption is relatively more elastic, and we should expect some conjunctural response in both herd sizes and in livestock feed norms to changes in the supply of grain, but nevertheless this item will be grouped with the other basic items. The conjunctural items are far more dependent upon supply availability. These items include exports and stock changes. In some respects urban consumption levels should be treated as conjunctural elements. We would not expect the peasant producers to be too directly concerned about the level of urban consumption unless there was a conjunction of factors making it in his interests to be concerned. But in fact, apart from exceptional circumstances when the government could do little about it, the government would ensure that urban consumption was treated as a basic and non-conjunctural consumption item.

When analysing the balances there will be little change in the basic

elements, and those changes which do occur will be largely explainable in mechanical terms, i.e. changes in the population, number of livestock etc. These items will consequently be fairly easy to estimate for a preliminary balance. The conjunctural elements however cannot be so easily estimated and planned and can only be derived as a rough residual in the preliminary balances.

However, as explained above there is some flexibility in the nature of what is conjunctural and what basic. One of the main characteristics of this period is the attempt by the government to plan the utilisation of normally conjunctural elements in the grain utilisation balance.

In this section I will begin by presenting an account of the major series of balances that were produced in this period. They will act as a guideline as I proceed with a more detailed chronological account of the different balances.

Conflicting series of grain utilisation balances were produced by TsSU and Gosplan in the early 1920s. In the late 1920s the Expert Soviet under TsSU was the only agency allowed to publish grain utilisation balances. The main series of balances produced by these three agencies at different times are reproduced in the following three tables[1].

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1. The series published in 1932 by TsUNKhU has been grouped together with the Expert Soviet data although it only appeared after the Expert Soviet and TsSU had been abolished.

The TsSU grain utilisation balances

(in mln. tons)

	1912/13	TsSU early 1920s 1920/21	1921/22	1922/23	TsSU mid 1920s 1922/23	1923/24	1923/24	1924/25	1925/26
				36.7					
Production	72.8	31.8		38.6	47.03	50.6	52.4	46.5	67.9
Consumption									
Rural									
Seed	11.7	7.4		6.5	8.2	9.4		10.2	10.7
Feed	11.1	4.3		4.9	6.9	6.9		6.0	11.3
Food	27.4	18.4		19.6	22.7	24.2	26.1	24.8	29.2
All rural	50.2	29.1		31.0	37.8	40.4	42.4	41.0	51.2
Urban									
Food	5.1			3.2	4.5	4.3		4.2	4.8
Feed	1.1			-	-	0.8		0.7	0.8
All urban	6.2	2.7		3.2	4.5	5.1		4.9	5.6
Army	0.8			2.6	0.7	0.7		0.5	1.0
Industry	0.4					0.2		0.2	
Export	10.7				0.8	2.5			10.2
All utilisation	68.2	31.8		36.8	43.8	48.8	50.8	46.6	67.0
Change in stocks and losses	+4.6					+1.8	+1.6		+3.2
Total	72.8	31.8		36.7	47.03	50.6	50.8	46.6	67.9
Basic part	57.5	31.8		34.2	39.8	46.3	46.7	46.6	56.8
Conjunctural part	115.3	-		2.6	4.0	4.3	4.1	-	10.9

The Gosplan grain utilisation balances

(in mln. tons)

		Early Gosplan				Gosplan mid 1920s				
	1908/09-1912/13	1913/14	1920/21	1921/22	1922/23 a	1922/23 b	1921/22	1922/23	1923/24	1924/25	1925/26p
Production	75.3	93.2	44.4	35.2	43.1	48.5	36.9	58.7	56.9	51.7	71.9
Consumption											
Rural											
Seed	13.1	14.3	7.1	6.1	7.1	8.2	8.4	10.7	11.3	11.9	12.9
Feed	13.1	17.5	8.7	6.3	7.8	4.9	5.8	8.4	8.8	7.9	12.4
Food	29.8	32.9	22.7	18.9	23.9	24.5	18.3	28.4	28.9	27.1	31.4
All rural	56.0	64.7	38.5	31.4	38.8	38.3	32.5	47.5	49.0	46.9	56.7
Urban											
Food	5.0	5.4		3.1	3.3	3.8	3.3	4.4	4.5	4.2	4.5
Feed	1.2	1.4					0.7	0.8	0.8	0.9	1.0
All urban	6.2	6.8	3.0				4.0	5.2	5.3	5.1	5.5
Army	0.8	0.9	3.0	0.9	1.1	1.1	0.9	0.7	0.7	0.6	0.5
Industry	0.7	0.8					0.4	0.8	0.8	0.9	1.4
Export	10.6	13.0				0.7		0.7	2.7	0.2	2.5
All utilisation	74.3	86.2	44.5	35.2	43.1	43.9	37.8	54.9	58.5	53.7	66.6
Change in stocks	+1.0	+7.0				+5.4	-0.9	+3.8	-1.7	-2.0	+5.3
Total	75.3	93.2	44.4	35.2	43.1	48.5	36.9	58.7	56.9	51.7	71.9
Basic part	53.7	73.2	44.4	35.2	43.1	42.4	37.8	54.2	55.9	53.5	64.1
Conjunctural part	11.6	20.0	-	0	0	6.1	-0.9	4.5	1.0	-1.8	7.8

Note: p. = planned

The Gosplan grain utilisation balances

(in mln. tons)

	1908/09+ 1912/13	1913/14	Early Gosplan 1920/21	1921/22	1922/23 a	1922/23 b	Gosplan mid 1920s 1921/22	1922/23	1923/24	1924/25	1925/26
Production	75.3	93.2	44.4	35.2	43.1	48.5	36.9	58.7	56.9	51.7	71.9
Consumption											
Rural											
Seed	13.1	14.3	7.1	6.1	7.1	8.2	8.4	10.7	11.3	11.9	12.9
Feed	13.1	17.5	8.7	6.3	7.8	4.9	5.8	8.4	8.8	7.9	12.4
Food	29.8	32.9	22.7	18.9	23.9	24.5	18.3	28.4	28.9	27.1	31.4
All rural	56.0	64.7	38.5	31.4	38.8	38.3	32.5	47.5	49.0	46.9	56.7
Urban											
Food	5.0	5.4		3.1	3.3	3.8	3.3	4.4	4.5	4.2	4.5
Feed	1.2	1.4					0.7	0.8	0.8	0.9	1.0
All urban	6.2	6.8	3.0	3.1	3.3	3.8	4.0	5.2	5.3	5.1	5.5
Army	0.8	0.9	3.0	0.9	1.1	1.1	0.9	0.7	0.7	0.6	0.5
Industry	0.7	0.8					0.4	0.8	0.8	0.9	1.4
Export	10.6	13.0				0.7		0.7	2.7	0.2	2.5
All utilisation	74.3	86.2	44.5	35.2	43.1	43.9	37.8	54.9	58.5	53.7	66.6
Change in stocks	+1.0	+7.0				+5.4	-0.9	+3.8	-1.7	-2.0	+5.3
Total	75.3	93.2	44.4	35.2	43.1	48.5	36.9	58.7	56.9	51.7	71.9
Basic part	53.7	73.2	44.4	35.2	43.1	42.4	37.8	54.2	55.9	53.5	64.1
Conjunctural part	11.6	20.0	-	0	0	6.1	-0.9	4.5	1.0	-1.8	7.8

The Expert Soviet grain utilisation balances 1925/26 - 1928/29 and later TsUNKhU balances 1928 and 1929.

(in mln. tons)

		Expert Soviet Balances				TsUNKhU Balances	
		1925/26	1926/27	1927/28	1928/29	1928	1929
Production							
Peasant		72.66	76.56	71.72	71.54		
SF & CF		1.45	1.34	1.40	1.79		
all rural		74.11	77.90	73.12	73.33	73.07	71.74
Urban		0.54	0.49	0.46	0.47		
All		74.65	78.40	73.58	73.80		
Consumption							
Rural	Seed	11.83	12.19	12.28	12.45	12.08	12.83
	Feed	19.38	22.79	23.30	22.60	21.68	21.02
	Food	27.36	27.24	27.32	27.74	27.74	27.49
	other	3.20	3.08	2.92	2.63		
all rural		61.77	65.30	65.82	65.42	61.50	61.34
Urban	Seed	0.06	0.06	0.06	0.06		
	Feed	1.55	1.55	1.54	1.54	0.83	0.84
	Food	4.44	4.56	4.91	4.85	2.34	1.88
	other	0.30	0.29	0.36	0.29		
all urban		6.35	6.46	6.86	6.74	3.17	2.72
Losses						0.52	0.78
Army & Industry		1.02	1.10	1.24	1.31	(4.88)	(5.44)
Export		2.06	2.61	0.45	-	-0.20	+0.19
All utilisation		71.20	75.47	74.37	73.47	69.87	70.47
Change in stocks		+3.45	+2.93	-0.79	+0.33	+3.20	+1.27
Total		72.66	76.56	71.72	71.57	73.07	71.74
Basic part		67.15	71.02	72.06	71.24	70.07	70.28
Conjunctural part		5.51	5.34	-0.34	+0.33	3.00	1.46

Sources for TsSU grain utilisation balances

Early TsSU Balances:

1912/13, 1920/21, P.I.Popov, Proizvodstvo khlebov v RSFSR..., M.1921, pp.32,45.

1922/23 N.I.Dubenetsky in Byulleten TsSU, No.72, February 1923.

Mid-1920s TsSU balances

1922/23 N.I.Dubenetsky, E O ,1924, no.8.

1923/24, 1924/25, 1925/26, Abrégé des données statistiques de l'URSS., M.1925, p.76

Gosplan balances

1908/09-1912/13, 1913/14, 1921/22-1925/26p from N.M.Vishnevsky, 'Khlebo-furazhnyi balans' in BSE, Tom IV,M.1926 p.479. Similar figure for 1921/2 - 1925/6p appeared in Kontrolniye Tsifry Nar.Khoz.SSSR na 1925/26g., M.1925, pp.74-5.

1920/21 - 1922/23 Early Gosplan balances from E.P.Dukhanina, Sel. i Les.Khoz., 1923, no.6, p.151.

Expert Soviet Balances

1925/26- 1928/29 Osnovniye elementy i produktsiya Sel.Khoz. 1925/26-1928/29gg.,M.1928, pp.117-131, also Statisticheskii Spravochnik SSSR za 1928g., M.1929, p.228 and Sel.Khoz.SSSR 1925-28gg., M.1929, pp.340-4.

TsUNKhU Balances

1928, 1929 Materialy po balansu Nar.Khoz.SSSR za 1928,1929 1930gg., M.1932, pp. 259-61.

The TsSU pre-war, 1920/21-1925/26 series is discontinuous as the figures for the years 1920/21-1922/23 were produced at a time when extremely low production data were accepted by TsSU. From 1923/24 to 1925/26 the TsSU series is comparable to the revised mid-1920s TsSU production data series. The most detailed of all these balances were the TsSU balances for 1923/24 which were constructed in connection with the TsSU work on the balance of the national economy for 1923/24[1].

In comparison none of the Gosplan grain forage balances were computed in any detail at all. With the exception of the very first balances for 1920/21 and 1921/22, the Gosplan balances appear to represent only the most general adjustments to the overall TsSU balances. This is not surprising considering that Gosplan was not in any position to gather separate data and consequently had to rely upon the basic data series produced by the different departments of TsSU. The later Expert Soviet balances were computed in considerable detail, and the balances for 1925/26-1928/29 were published in much detail. Unfortunately no balance for 1929/30 was ever published.

The official history of Soviet state statistics informs us that the reason for the cessation of the publication of grain forage balances after 1928/29 was the cessation of the construction of preliminary operational grain forage balances at this time. It is implied that the introduction of the contract system for organising grain procurements did away with the necessity for producing and publishing operational grain forage balances[2]. After this period it is claimed that only final accounting balances were constructed.

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1. See Trudy TsSU, Tom XXIX, M.1926.
2. Istoriya Sovetskoi Gosudarstvennoi Statistiki, M.1969, p.159.

The account that we have already given of the conflict in the Expert Soviet over the evaluation of the 1929/30 preliminary grain utilisation balance indicates the spurious nature of this argument. But it remains true that no more preliminary balances were published after this period. And even the final accounting balances which have now been published were constructed in a way that makes them very difficult to compare with the earlier data, and which makes them somewhat less useful. These later balances have been grouped together according to calendar years instead of according to crop years (July to June).[1]

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1. According to the official history of statistics, these balances were initially drawn up for every half year and so they could have been easily aggregated into crop years, but in all the published accounts of these figures they have been aggregated according to the less revealing calendar year division. (See Istoriya Sovetskoi Gosudarstvennoi Statistiki, M.1969, p.159).

a) Grain utilisation balances during War Communism

During the period of War Communism much of the country was lost to central Soviet control. Many important producer regions were cut off from the northern consumer regions. The Germans followed by the countries of the entente and the armies of Yudenich, Denikin and Krasnov occupied much of the Ukraine and the North Caucasus throughout the 1918 and 1919 agricultural seasons. In the East the army of Kolchak had penetrated as far as Upper and Central Volga by the summer of 1918 and was still in the Upper Volga regions in the beginning of 1919. By the summer of 1919 the armies of Denikin had occupied much of the Central Agricultural Regions: the towns of Kursk, Orel and Voronezh had fallen by October 1919. As the front pressed further into the producer regions and closer to Moscow, the regional grain balance became severely dislocated. Local balances were no doubt drawn up to assist the procurement agencies in their immediate tasks. But no large scale regional balances have been discovered and it is doubtful whether any such balances would have been drawn up in such desperate and uncertain circumstances. After October 1919 as the White armies were beaten back on all fronts the situation must have eased and the leaders had time to worry about getting an overall statistical indication of the level of grain production and utilisation in the growing area that was coming under its control. In the autumn of 1919 Lenin requested TsSU to send him for his personal use materials on the level of the consumption of food in Soviet Russia[1]. At this time Lositsky's department had not yet completed its first surveys but some materials were available from Litoshenko's department of peasant budget statistics, and for workers from various sources including Strumilin's Central Bureau of Labour Statistics

1. See I.G.Maly, Voprosy statistiki narodnogo potrebleniya v trudyakh V.I.Lenina, M.1964, pp.42-7.

(of VTsSPS, NKTrud and TsSU)[1].

Some of the material that was handed over to Lenin was included in an article which Lenin wrote at the time as an illustration of the level of contemporary grain production and utilisation[2]. The illustrative table given by Lenin in that article is given below:

(in mln. tons)

26 Gubernii of Soviet Russia	Population in mlns.		Production excl.seed & fodder	Grain supplies from NKProd	unofficial sources	Total for consumption	Per Capita
Consuming G.	urban	5.9		0.33	0.33	0.66	0.111
	rural	13.8	1.87	0.20	0.46	2.48	0.180
Producing G.	urban	4.4		0.34	0.34	0.68	0.156
	rural	28.6	10.24			7.89	0.277
Total 26 Gubernii		52.7	12.11	0.87	1.12	11.71	0.223

Lenin reproduced this table to draw attention to the importance of the non-organised supply in supplying the urban population with at least half the grain it was consuming. In December of the same year Lenin wrote an uncharacteristically polite letter to Popov asking him, 'if it would not be too much trouble' to comment on an illustrative scheme of consumption norms for different sections of the population in the pre-war and the contemporary period that he had constructed. Lenin also asked Popov if it was possible for him to get one of his experts to calculate such a table for him[3].

In the spring of 1920 at the IX Party Congress (March/April 1920), Lenin cited a series of Lositsky's grain consumption norms to indicate that the peasants were consuming more grain in the producer gubernii than they consumed before the war.[4] This was a clear demonstration that the

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1. See p.508 for more detail on these sources
2. N.Lenin, Pravda, 7/11/1919, reproduced in V.I.Lenin Pol.Sobr.Soch., vol.30, p.429.
3. See VS, 1967, no.5, p.55.
4. Lositsky's norms had first appeared in Bulleten TsSU 1920, No.19/20, p.5

the grain was available and only needed to be requisitioned with sufficient force. No overall balance was presented by Lenin at this time but a short while later, presumably in response to Lenin's request to TsSU for assistance[1], Lositsky published a more detailed and slightly modified grain utilisation balance. This balance is given below:

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1. See V S 1967, no.5, p.55.

Grain production and utilisation in the 26 gubernii under Soviet control in 1918/19 in mln.tons.

Regions and categories of population	Popln. in mlns.	net prodn. of grain food grains	feed grains	all	Feed needs	Remainder	Collected all	NKP	Unofficial	Supplied all	NKP	Unofficial	Consumed	per capita
Consumer Gubernii														
Urban Population	5.868									0.79	0.30	0.49*	0.79	0.134
Rural Population	13.860	1.69	0.99	2.68	0.80	1.88	0.04	0.04	-	0.66	0.23	0.43	2.50	0.180
Total	19.728	1.69	0.99	2.68	0.80	1.88	0.04	0.04	-	1.45	0.53	0.92	3.29	0.167
Producer Gubernii														
Urban Population	4.385									0.79	0.37	0.42	0.79	0.180
Rural Population	28.600	8.77	4.13	12.90	2.66	10.25	2.51	1.23	1.28				7.73	0.270
Total	32.985	8.77	4.13	12.90	2.66	10.25	2.51	1.23	1.28	0.79	0.37	0.42	8.52	0.259
ALL	52.713	10.46	5.12	15.58	3.45	12.12	2.56	1.27	1.28	2.24	1.05	1.35	11.81	0.224

Source: A.E.Lositsky, V.S., 1920, no.1-4, p.67-70.

Note: * Includes 0.07 mln.tons supplied by Meshochniki (Bag traders) from the Volga regions.

In order to evaluate the size of grain exchange Lositsky used all the available production and utilisation data. Part of these data he classified as being of good quality. This covered data for the agricultural population, sown area and harvest for 1918 (from the 1917 census and the 10% sample survey for 1919), data for collections by state organs and for the supply of the population by organised state supply organs, and it included the quantity of livestock and also its standard feed norm[1]. These good data were supplemented with what Lositsky himself calls less reliable data from the just completed budget survey of consumption of the town and rural populations. This was held to be fairly unreliable because much of it had only been recorded over one fairly short period of one month and so could not account for the quite significant seasonal variations.

The major difference between these figures and those given by Lenin earlier is that the position in the towns is slightly less desperate than earlier indicated by Lenin. Lositsky has managed to find an additional 20% of grain (0.13 million tons) for consumption in the consumer region towns and an additional 15% (0.11 million tons) in the producer towns. But the overall conclusions made by Lenin concerning the abundant supplies in the producer regions and the importance of unofficial trade remain valid.

By 1920 the military position looked much better. With the exception of the Poles in the West, most of the other enemies had been pushed well out of the way, liberating most of the producer regions[2]. As already described above an agricultural census was carried out in this year and this served as the basis for calculating most agricultural statistics including the balances for the next few years.

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1. It seems most unlikely that the feed level could be known at all accurately.

2. Vrangel was pushed back to the Crimea and Kolchak had retreated to the Far East. Fighting was still continuing in the Caucasus but most of the North Caucasus had been liberated.

The Polish counter-attack in the Summer and the temporary loss of Western Ukraine did lead to a slight deterioration during the year. But by the time that the results of the 1920 census were ready, the conflict with the Poles had ceased and the leadership for the first time could face the problem of sorting out the major economic problems. The most important of these problems was how to ensure that the Northern Consumer Region managed to get the grain which it traditionally required from the other regions. This problem will be discussed in the next section.

b) The early balances and the beginning of conflict between TsSU and Gosplan 1921-1923

The first rudimentary grain forage balance that covered any large area in the post revolutionary period was the one produced by P.I.Popov in the spring of 1921 for the Xth Party Congress. This balance was offered in support of Lenin's speech on the change in policy from requisitioning to a tax in kind. In the materials which were submitted 'for the attention of delegates only', Popov asked what would the level of grain production have to be in order for the level of consumption to be at the pre-war level?[1] Popov informs us that in pre-war times the level of rural consumption was overall 21 pds.per head (0.344 tons per head) which comprised 18 pds.per head (0.295 tons per head) for personal consumption and 3 pds.per head (0.049 tons per head) for livestock consumption, and the level of urban personal consumption was 15 pds. per head (0.246 tons per head). Consequently, in order to maintain these levels of consumption for an estimated 95 million rural population and 16 million urban population it would require

$$(95 \times 21) + (16 \times 15) \text{ mln.pds.} = 36.61 \text{ mln.tons net of seed.}$$

However this was significantly larger than 27.98 mln.tons of grain net of seed which Popov reported as being produced in 1920.

In order to estimate the likely order of grain surpluses from the peasant population Popov proposed the following procedure.

All the peasant households were grouped according to their sown area as based on the 1919 sample survey of peasant households. Given an average net yield of 28 pds/desyatina (4.2 tsentners/hectare) many households would produce less than the 18 pds.per person average consumption norm. Popov

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1. See Khlebnaya produktsiya Sovetskoi i Federiryuemikh s nyeyu Respublik, M.1921, p.6.

proposed that the minimum likely average consumption norm would be 12 pds. per head (0.197 tons per head). In calculating the possible level of peasant surpluses Popov therefore adopted a level of consumption of 12 pds. per person for all households which produced less than 12 pds. per head net of grain, 18 pds. per head for all households which produced more than 18 pds. per head net of grain and all of net production for those households that produced between 12 and 18 pds. per head of grain net. Those peasant households producing more than 18 pds. per head would therefore produce surpluses, whilst those producing less than 12 pds. per head would require part of these surpluses in order to bring their level of consumption up to the minimum norm.

These levels of personal consumption would require a total rural consumption of 1771 mln.pds. (29.01 mln.tons) which was already greater than the recorded level of net production of 28 mln.tons. The surplus producing households would produce a surplus of 381 mln.pds. (6.24 mln.tons), but those households producing less than 12 pds. per head would themselves require an additional 383 mln.pds. (6.28 mln.tons) of grain. Therefore there was insufficient grain being produced to satisfy even this normal to minimal level of peasant consumption let alone to provide the 240 mln.pds. (3.93 mln.tons) needed by the urban population or anything required by the livestock.

The regional incidence of these surpluses and deficits, as given by Popov are indicated in the following table, in million tons:

	Popln.	Prodn.	Cons. based on norm	Surplus	Deficit	Balance
Rural Areas						
Consumer Region NCR	21.28	4.71	7.96	0.41	3.65	-3.24
UkSSR	20.90	7.30	6.16	1.86	0.72	+1.14
South East	6.15	3.33	1.81	1.65	0.13	+1.52
SPR	27.05	10.63	7.97	3.51	0.85	+2.66
Producer region CPR	35.99	9.42	8.93	1.85	1.36	+0.49
Siberia EPR	10.71	3.22	3.16	0.58	0.52	+0.06
All USSR	95.04	27.98	29.00	6.24	6.28	-0.04
Urban Areas	16.04	-	3.93	-	3.93	-3.93
Total USSR	111.08	27.98	32.93	6.24	10.21	-3.97

Source: computed from P.I.Popov, Khlebnaya produktsiya Sovetskoi i federiryuemikh s nyeyu Respublik, M.1921, pp. 11,14,15.

This balance of Popov's was cited by both Lenin and Tsyurupa as providing the economic basis for the argument in favour of changing the requisitions policy for a policy of taxation in kind, which became the basis for NEP.

Several months after the Party Congress, when the decision to change to a tax in kind had already been made and when the 1920/21 agricultural year was coming to an end, Popov produced a much enlarged version of his earlier pamphlet[1]. This revised version provided a much more detailed indication of a pre-war grain forage balance. The size of the 1920 harvest was slightly revised and slightly lowered from 32.1 mln.tons to 31.8 mln.tons[2]. And much more attention was paid to giving an indication of the possible size of the 1921/22 grain utilisation balance.

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1. P.I.Popov, Proizvodstvo khleba v RSFSR i federiryuyushikhsya s nyeyu respublikakh, M.1921.
2. Popov explained the need for this revision as being due to the more extensive use of the materials from the 1920 census. (See P.I.Popov, Proizvodstvo...., M.1921, p.32.)

Popov produced three grain forage balances worked out for three possible levels of production based on the 1920 sown area. The first case represented the balance for a year of low yield, the second for a year with the average level of pre-war yield and the third for a year with a high level of yield. The actual level of production in 1920 corresponded to the low yield level. In the absence of any sign of increased sown area Popov proposed that the same sown area figures could be accepted for 1921. These three possible variants consequently indicate the possible range of production and the balances which would be associated with each point on the range. These variants are given in the following table, in mln. tons:

	Final preliminary balance 1920/21	Three possibilities for 1921/22 balance			Average pre-war norms
		Low yield	average yield	high yield	
Production	31.8	31.8	44.7	61.2	
Consumption					
Rural seed	7.4	7.4	7.4	7.4	
feed	4.3	4.3	7.1	11.4	
food	18.3	18.3	22.9	27.3	
All rural	30.0	30.0	37.4	46.1	
Total	31.8	31.8	44.7	61.2	
basic part	32.8	32.8	40.4	49.3	
conjunctural part	-1.0	-1.0	4.3	11.9	
Per capita cons.norms in tons					
Rural food	0.193	0.193	0.241	0.288	0.282
feed	0.046	0.046	0.075	0.120	0.136
Urban food	0.170	0.170	0.170	0.170	0.170

Source: P.I.Popov, Proizvodstvo khleba...., M.1921, pp.17,19,45,47.

These balances indicate that even if there had been an average pre-war level of yield in 1921, the only way that a satisfactory balance could be made would require a level of rural personal consumption some 15% lower than the average pre-war level, and an average feed consumption level some 45% lower than average. In the event of another low yield the food consumption level would drop to 32% lower than the pre-war level and the livestock feed level to 66% below the pre-war level. Only in the eventuality of there being a high yield would the peasants be able to maintain their pre-war levels of food consumption.

This explained why it was going to be difficult to extract surpluses from the peasantry. If there was as average or lower than average harvest the peasants would easily consume all possible surpluses unless they were given a real incentive not to. And this was the justification for NEP.

Popov admitted that the seriousness of the picture may have been slightly exaggerated due to faulty statistics:

> We have not excluded the possibility that in a few regions there was a higher level of production, due to the higher level of yields than could be caught by the agricultural statistics, since the population under the pressure of "prodrazverstka" attempted to lower the appearance of the size of yields, and apart from that, the surveys in all probability did not always catch those sown areas which in the consuming areas were scattered on clearing and virgin land as they did not enter into correct rotations, although the collection of grain from them served to supplement the grain budget of the population. In the producer regions where meadows and neglected arable land existed, the survey

> in all probability was unable to catch those pieces of land that did not feature in the general rotation. A detailed attempt to determine the scale of production will only be possible after an investigation of the quantities of food and norms of cattle feeding being produced at the present time by TsSU. At the appropriate time we will make the corresponding corrections.[1]

But Popov had earlier indicated that he did not expect that the receipt of additional material would essentially affect his conclusions and that it would not change the figures by more than 5-7%:

> The receipt of more detailed material from all gubernii might well change our calculations in a few parts, but I repeat that these changes cannot alter our conclusions, because a difference of plus or minus 5-7% will not essentially change these conclusions. It is necessary to make these remarks for those comrades who consider that general statistical accounts must have absolute exactness (arithmetically), since the nature of source materials is such that we cannot have such exactness[2].

Popov did not get around to making these corrections before Strumilin, adopting the methodology suggested by Popov and the latest consumption norm figures supplied by Lositsky, made the corrections himself and came up with some startling conclusions. Instead of the need to inflate the output figures by 5-7%, making no fundamental difference to the conclusions based upon them, Strumilin claimed that the correction needed was all of 34.6%.

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1. P.I.Popov, Proizvodstvo khleba...., M.1921, p.49.
2. P.O.Popov, Proizvodstvo khleba....., M.1921, p.32. It is interesting to point out that one of the comrades who had imputed a degree of exactness into these figures when he had cited them at the Xth Party Congress was V.I.Lenin (Desyati syezd RKP(b) M.1963 pp.413-4).

Just 4 months after the historic decisions of the Xth Party Congress such a public challenge to the figures accepted as providing the economic justification for NEP could not help but have a great political significance.

The best presentation of Strumilin's arguments were given in the following table[1]:

The relationship between the production of grain according to the data on harvest statistics and the actual consumption of the population in 1920/21 as given by Strumilin
(in million tons)

	NCR	UkSSR	South East	SPR	CPR	EPR	All USSR	All USS correct
Production	3.52	10.08	3.83	13.91	9.60	5.02	32.05	43.12
Consumption								
Seed	0.88	1.68	0.89	2.57	2.81	1.18	7.44	7.44
Livestock	1.06	2.02	0.59	2.61	2.51	0.95	7.15	7.15
Army							1.47	1.47
Govt.Livestock							0.98	0.98
Balance for Personal consumption							15.01	26.08
Personal consumption according to consumption data.								
Rural	4.98	6.49	1.57	8.06	7.78	2.51	23.33	23.33
Urban	0.79	0.74	0.25	0.99	0.75	0.23	2.75	2.75
All	5.77	7.22	1.82	9.04	8.53	2.74	26.08	26.08
Correction required							-11.07	
in %							34.5%	
corrected production							43.12	

Source: S.G.Strumilin, Na Planovom Frontye, M.1958 pp.28-9

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1. See S.G.Strumilin, Narodnoye khozyaistvo, 1921, no.5 (Oct?)., reprinted in Na Planovom Frontye, M.1958, pp.24-34.

   A similar table had been given in Strumilin's article 'Prodovolstvenniye resursi', Ekon.Zhizn.,no.159, 22 July 1921.

Popov's initial reply to Strumilin's attacks was published in Pravda in August 1921[1]. In this reply Popov stated that Strumilin's conclusions were 'unsatisfactory and at their root mistaken'. Popov promised that 'within a few days' he would point out where and in what lay Strumilin's errors, but at the moment he was engaged in other activities for STO and SNK and could not spare the time.

Understandably, with such attacks being made on the accuracy of the data providing the economic reasoning for NEP, Lenin was not feeling too well disposed towards Popov. The earlier friendly tone of Lenin's letters to Popov was replaced by a much more officious tone and as noted above Popov came in for a particularly large barrage of complaints and accusations of 'scholasticism' 'bureaucratism', procrastination' and 'inefficiency' on the 16th of August 1921 (two days after his reply to Strumilin). Popov's reaction to this as we have already noted, was an attempt to resign. Lenin refused to accept this resignation and took care to have this matter kept secret, apart from notifying Krzhizhanovsky, head of Gosplan.[2]

In public Strumilin continued his attack. Later in August he asked sarcastically if they were to expect statisticians to write about the prospects of the harvest and consequently resources available in July of that year or a year or two after the full collection of the harvest[3].

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1. Pravda, no.179, August 14, 1921.
2. See Lenin's letter to Krzhizhanovsky 22/8/1921, V.I.Lenin, Pol.Sob.Soch., Tom 35, pp.423-4
3. See Ekon Zhizn, no.186, 27.8.21.
   Three years later Strumilin was still complaining that he had not received an explanation of these particular 'errors' from Popov (See S.G.Strumilin, Plan khoz., No.4-5, 1924, p.160).

While Popov and Strumilin were arguing over the real size of the 1920 harvest, it was becoming clear that the new 1921 harvest was turning out to be even worse than anything envisaged in Popov's three possible variants. The level of grain sowings in 1921 appears to have been lower than in 1920 although there is some doubt as to how much[1]. And apart from this very low level of sown area the weather had been exceptionally bad, causing a very severe drought in the South and Volga areas[2]. But neither Popov nor Strumilin appear to have made a public indication of what the 1921/22 balance was going to look like. Popov failed to revise his three preliminary variants and Gosplan appears to have been quite silent about the 1921/22 harvest[3]. NKZem, however, appears publicly to have been showing more concern. An article on the grain balance in this year appeared in the delayed issue of the NKZem journal, written by S.Klepikov, the expert on grain consumption statistics[4]. Klepikov wrote his article and constructed his preliminary grain forage balances on the basis of the preliminary accounts of the harvest prospects, warning in July about the desperate nature of the situation. But the article was delayed in publication until at least October, when the seriousness of the famine was apparent to all.

In his article Klepikov produced the following indication of the regional balance for the European part of the RSFSR (excluding the UkSSR) as it appears to have been for 1913/14, 1920/21 and as it would need to be

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1. See above.
2. There is considerable independent meteorological data available to substantiate this picture. See S.G.Wheatcroft, SIPS.No. 13, Birmingham, 1978.
3. One of the earliest articles by a Gosplan worker analysing the grain balance for 1921/22 was V.G.Groman in Ekon.Zhizn., 21/4/1922. Later in 1923 several accounts of the Gosplan 1921 balance appeared. (See E.P.Dukhanina, 'Urozhai poslednikh trekh let 1920-2g.', Sel.i Les.Khoz., 1923, no.6, pp.149-56, for an account of this and other balances).
4. See S.Klepikov, 'Neurozhai 1921 goda. (Tsifry i fakty)', Sel. i Les.Khoz., 1921, No.1-3, pp.195-211. The article was signed on 15/7/1921, but a more detailed appendix on the position in the famine regions was added on October 24, 1921.

in 1921/22 in order to avoid large scale food shortages:

Grain production and utilisation in the European part of the RSFSR (excluding UkSSR) in mln.tons:

Year	Prodn.	Seed	Food & Feed	All local rural utiln.	Rural Balance	Other local utiln.	Regional Balance
1913/14	57.75	7.71	29.92	37.63	+20.12	11.24	+8.86
1920/21	20.55	5.04	17.78	22.82	-1.46*	?	?
1921/22	11.22	5.69	13.78	19.47	-6.61	?	?

Source: S.Klepikov, Sel.i Les.Khoz., 1921, No. 1-3, p.203.

Note: *The figure of 1.46 mln.tons was given by Klepikov although the other figures in the balance would require a balance item of 2.27 mln.tons.

In this analysis Klepikov used a very simple undifferentiated consumption norm for 1913/14 and 1920/21 of 15 pds. (0.246 tons) per head of grain and potatoes for the rural population and 13 pds. (0.213 tons) per head per year for the urban population. And for the 1921/22 consumption norms, because of the undoubted pressure on food resources in this year Klepikov used a norm of 13 pds. (0.213 tons) of grain and potatoes per year for the rural population and 12 pds. (0.197 tons) per head per year for the urban population[1].

The European part of the RSFSR includes the CPR as well as the NCR, and in the last pre-war year according to these figures by Klepikov it produced a rural surplus of over 20 million tons, and a surplus of almost 9 million tons when the urban consumption of this region was deducted. By comparison in 1920/21 and 1921/22 there does not even appear to have been a rural surplus, and the figures indicated a quite significant rural deficit (6.61 mln.tons) in 1921/22.

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1. See S.Klepikov, ibid., pp.200-201.

The appendix to this article was even more gloomy. It was concerned specifically with the famine regions and indicated that in many areas[1] the grain produced was insufficient even to cover the grain seed requirements let alone cover the personal consumption of the rural population and provide a surplus.

There were no other grain utilisation balances discussed in the NKZem journal at the time. And it was not until 1923 under very different circumstances that other figures appeared in this journal for the 1921 balance. These later figures were given for all the USSR (less Central Asia and ZSFSR) in an article by E.P.Dukhanina who appears to have been a firm supporter of the Gosplan series of figures. The data given by Dukhanina are presented in the following table:

	Population in mlns.(* sown area in mln. hectare)		Norms in tons/head or tons/ hectare		Grain consumption or production in mlns.tons.	
	1920	1921	1920	1921	1920	1921
Utilisation						
Seed	54.98*	48.09*	0.129	0.127	7.09	6.09
Feed	97.6	99.7	0.090	0.064	8.73	6.32
Rural food	97.6	99.7	0.233	0.190	22.69	18.94
All rural					38.51	31.35
Urban food	17.9	18.2	0.165	0.167	2.95	3.05
Food for Red Army & official livestock					2.95	0.88
All Consumption					44.41	35.15
TsSU Production data					29.83	23.19
Production & imports					29.83	26.11
Insufficiency					14.76 (33.2%)	90.4 (25.7%)

Source: E.P.Dukhanina, 'Urozhai poslednikh trekh let 1920-1922gg.', Sel.i Les.Khoz.,1923, No.6, pp.149-56.

1. Astrakhanskaya G.,Samarskaya G.,Markshtadtskaya G., (later the German Volga Republic), and Stavropolskaya G., all registered a level of production less than the normal seed requirements of these Gubernii. Other Volga and Urals Gubernii had only marginally higher indications of production. See S.Klepikov, ibid., pp.206-11.

The figures for 1920 were very similar to those which had earlier been given by Strumilin, and like Struminlin's figures they indicated a level of consumption over 33% higher than the level of production accepted at the time by TsSU. Despite a reduction in utilisation by the army and official livestock by more than two thirds, and a reduction in the rural food consumption norms by 18.5% and a reduction of 29% in the per capita livestock feed norms, the 1921 consumption figures were still 25.7% higher than the TsSU production data. According to the uncorrected TsSU data the 1921 harvest was 15.6% lower than the 1920 harvest, but the consumption data claim that it was 20.9% lower.

Unfortunately no regional balances at all are available for 1921/22, apart from the Klepikov preliminary balance for the European part of the RSFSR.

The 1922 harvest at last brought some relief, and with the improvement we see a flourishing of grain utilisation balances. The major variants of the different TsSU and Gosplan balances for 1922/23 are given in the following table. See following page.

The first and most detailed balance was the official TsSU preliminary grain forage balance, which was produced by N.I.Dubenetsky's department of current agricultural statistics and was published in the official TsSU bulletin in February 1923 (See column 1). This was before the end of the 1922/23 year, before the drastic revision in TsSU grain outlook at a time when the general statistical knowledge on such vital questions as population size was still very poor. The area covered in this and most of the early balances was that for the USSR less ZSFSR, Central Asia and the Far Eastern Regions. The level of production of 36.74 mln.tons given in this source was the product of an average yield of 7.61 tsentners per hectare over a sown area of 48.2 mln.hectares and was thus roughly analogous to the figures cited in Trudy TsSU,Tom VIII, vyp.4, M.1923.

The grain forage balance for 1922/23 in mln.tons from various sources.

	TsSU Balances					Gosplan Balances					
	1	2	3	4a	4b	5	6	7a	7b	8	9
gross production	36.74	40.98-41.79	47.03			43.10	48.54	49.80	53.04	48.08	58.74
seed	6.52	7.24	8.24			7.09	8.24	9.78	10.42	8.68	10.70
feed	4.90	5.36- 6.16	6.90	8.99	8.21	7.76	4.90	4.90	7.50	6.39	9.39
Rural food	19.56	20.69	22.70	27.65	25.01	23.87	24.47	25.13	25.13	24.73	28.42
Urban food	3.14	4.00	4.46	4.65	4.12	3.31	3.77	3.93	3.93	3.60	4.44
feed	-	-	-	0.82	0.82	-	-	0.98	0.98	-	0.98
Army		0.74	0.7			1.08	1.06			0.98	0.70
Industry											0.82
Export		1.15	0.75				0.69	1.44	1.44	0.41	0.66
Stock change	2.62										
All		2.55	3.24				5.41	3.63	3.63	3.28	3.60
Visible		0.98	1.23				2.95	1.47	1.47	1.23	1.47
Peasant		1.57	2.01				2.46	2.16	2.16	2.05	2.13
Total	36.74	40.99-41.79	47.03			43.10	48.54	49.79	53.04	48.08	58.74
Basic	34.12	37.29-38.09	43.04			43.1	42.44	44.72	47.97	44.39	54.48
Conjunctural	2.62	3.70	3.99			-	6.10	5.07	5.07	3.69	4.26

Sources and notes for table of various grain forage balances for 1922/23

Sources:

1. N.I.Dubenetsky, Byulleten TsSU, No.72, February 1923, cited here from V.E.Den, Kurs Ekonomicheskoi Geografii, L.1925, pp.219-221.

2. N.I.Dubenetsky in report to Gosplan SES on 16/11/1923 as cited in E.Groman, Bulletin Gosplana, No.10, 1923.

3. N.I.Dubenetsky, Ekon.Obozrenie, No.8, 1924, pp. 36-46

4. A.E.Lositsky, Khlebnyi Rynok, No.4-5, 1924, p. 23.

5. E.P.Dukhanina, Sel.i Les.Khoz., No.6, 1923, pp.149-56

6. V.G.Groman, in Khleboprodukt, Prilozheniye k godichnomu statisticheskomu otchetu o deyatelnosti Obshchestva, M.1923, pp.3-11.

7. E.Groman, Bulletin Gosplana, No.10, 1923, pp. 120-4.

8. V.G.Groman, Khoz.Polozhenie SSSR, M.1924, pp.45-6.

9. N.M.Vishnevsky, 'Khlebofurazhnyi balans', in BSE, Tom IV M.1926. p.479 These figures also appeared in Kontrolniye Tsifry Nar.Khoz.SSSR na 1925/26gg., M.1925, pp. 74-5

Notes:

Covers all main grains in all areas of the USSR less Central Asia, ZSFSR, and Far Eastern Region.

The earliest Gosplan balance that I have seen was the one published by E.P.Dukhanina at about this same time in the major NKZem journal (see column 5). This one covered the same area as the TsSU balance and had a value some 17% larger at 43.1 mln.tons. The major differences were in the size of feed allocation (58.4%), and rural food allocation (22%). Other much more sophisticated but much larger Gosplan balances were produced shortly afterwards (see columns 6, 7 and 8). The balance given in column 6 with an overall utilisation of 48.5 mln.tons was produced by V.G.Groman specifically for the main organisation involved in grain collections[1]. Groman was therefore proposing to the grain traders that the level of grain production was 32% larger than indicated by TsSU. He disagreed with Dukhanina and placed the feed allocation at the same level as that given in Dubenetsky's initial balance. But he placed the seed allocation 26.4% higher, the rural food allocation 25% higher and the urban food allocation 20% higher. But apart from these differences the major difference was in Groman indicating a possible increase in stocks of 5.4 mln.tons, almost 3 mln.tons of visible stocks and 2.46 mln.tons of peasant stocks. By comparison Dubenetsky's balance had only allowed 2.6 mln.tons for stock additions, army, industry and export use all taken together. Groman allowed 1.75 mln.tons for the last three items and therefore the difference in amounts of grain allocated to stock changes was less than 1 million tons in Dubenetsky's balance but over 5.4 mln.tons in Groman's. This would clearly have very great significance for the orientation of the grain collectors and for economic policy in general.

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1. An account of Groman's balance was attached as a supplement to the annual statistical account of the activities of khleboprodukt. Khleboprodukt, Prilozheniye k godichnomu statisticheskomu otchetu o deyatelnosti Obshchestva, M.1923, pp.3-11.

In his account Groman states that his figures were very close to the independent calculations made by N.M.Vishnevsky in Gosplan's Statistical Economics Section[1]. Later in 1924, in connection with an account of the 1923/24 preliminary balance, Groman did in fact cite the original Vishnevsky 1922/23 balance, which has been reproduced in column 8. As will be seen Vishnevsky's balance was indeed very similar to the Groman balance but gave a much less optimistic picture of stock additions; in all 3.3 mln.tons instead of Groman's 5.4 mln.tons, a level of visible stock additions of only 1.23 mln.tons in comparison with Groman's 2.95 mln.tons.

Apart from the above mentioned Gosplan variants another Gosplan worker E.Groman provided two further even higher variants in the Gosplan bulletin towards the end of 1923 (See columns 7a and 7b). E.Groman provided a low variant of 49.8 mln.tons and a higher variant of 53.04 mln.tons. Most of this increase was taken up in additional utilisation on seed, personal consumption and for the higher variant on livestock feed. The sum of 3.6 mln.tons allowed for stock additions was considerably lower than Groman's initial figures but slightly higher than Vishnevsky's figures.

The higher E.Groman variants must have been published right in the middle of the TsSU crisis of its re-evaluation of the general scale of the early 1920s grain production, when TsSU had already decided to accept a higher series of figures. The Groman and Vishnevsky and Dubenetsky balances had however been produced before TsSU's capitulation.

As will be remembered the TsSU capitulation came at the special enlarged collegium session on July 20, 1923.

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1. See V.G.Groman, khleboprodukt, Prilozheniya..., M.1923, p.7.

The following five months were taken up with a sharp debate over how this increase should be justified and how grain production in the future should be calculated. It was while this debate was going on that several more balances and balance items were produced.

Dubenetsky was reported to have submitted a revised balance to Gosplan SES on 16/11/1923. It is reproduced in column 2. As can be seen it has a level of gross production of less than 42 million tons, which was considerably lower than the 45.7 mln.tons that was proposed as the preliminary harvest figure by Popov in July. The rise from the preliminary balance of February 1923 has occurred because of an inflation in all items and especially for feed and urban food. A separate item for stock changes is now indicated which has a value of 2.55 mln.tons; 0.98 mln.tons visible stock accumulations and 1.57 mln.tons peasant stock accumulation. These are still however much lower than the Groman or Vishnevsky figures.

Later in April 1924, A.E.Lositsky, the head of the TsSU Department of Consumption Statistics, published in the major grain trade journal an account of the size of the major consumption items for 1922/23, which indicated that a much higher balance was required. These figures are given in column 4a and 4b. The publication of these figures appears to have coincided with Stalin's attack on the statisticians and on Strumilin's renewed offensive against Popov.

Although the final accounting balance which was produced by Dubenetsky in August 1924 had raised the level of gross production to 47 million tons (see column 3), almost the level initially advocated by Groman and Vishnevsky, this was still considered to be far too low by Gosplan. The final balance for 1922/23 produced by N.M.Vishnevsky in Gosplan SES

had a value of over 58.7 mln.tons (See column 9). (Note this includes utilisation in all USSR).

Of all the above mentioned balances only the first preliminary TsSU balance was produced with a rough regional breakdown. Most of the Gosplan balances could not be given in such detail because they were calculated from very crude aggregate data. The regional breakdown as given in the TsSU preliminary balance is indicated in the table below:

The preliminary TsSU grain balance for 1922/23, in millions of tons.

1922/23		Production	Utilisation	Balance
Consumer Regions	NCR	5.83	7.67	-1.83
UkSSR		13.15	9.94	+3.21
South East		3.41	2.52	+0.88
	SPR	16.56	12.46	+4.09
Producer Regions	CPR	12.97	12.56	+0.41
Siberia		2.29	2.69	-0.39
Kirgizia		0.93	0.98	-0.05
	EPR	3.22	3.67	-0.44
All USSR-SCR*		38.61	36.38	+2.23

Source: N.I.Dubenetsky, Byulleten TsSU, no.72, February 1923, cited here from V.E.Den, Kurs Ekonomicheskoi Geografii, L.1925, pp.219-21.

Note: * The area referred to as all USSR-SCR is in fact all pre-1939 area of USSR less ZSFSR, Turkmenia and Far Eastern Regions.

This table indicates the unusual position in the EPR with a deficiency of grain, the relatively low level of surpluses coming from the CPR and the major significance of the Ukraine in providing surpluses.

c) The grain forage balances for 1923/24

1923 was a disappointing year;despite the increase in sown area the fall in average level of yield resulted in an overall level of production lower than in 1922. This is indicated in both the TsSU and Gosplan figures, although the change in level of corrections applied by TsSU at this time could give the misleading impression that the 1923 harvest was higher than 1922.

All the available grain forage balances for 1923/24 have been listed in the following table (see over page). It will be seen that the preliminary TsSU balances (columns 3 and 4) were of roughly the same magnitude as the preliminary Gosplan balances (columns 1 and 2). The later TsSU balances which appeared in 1925 and 1926 were about 6 million tons larger (see columns 5 and 6). And the later Gosplan balance produced by Vishnevsky in 1925 was a further 4.5 million tons larger than the later TsSU balances (see column 7).

Sources 1-3 cover peasant grain production in the pre-1939 area of the USSR less ZSFSR, Turkmenia and the Far Eastern Regions. Source 4 covers the same area but includes the production on Sovkhoz, estate and urban lands which was equal to about 0.85 mln.tons. Sources 5,6 and 7 cover all the pre-1939 area of the USSR and presumably the production of all lands. The difference in regional coverage alone would account for 4.75 mln.tons of the difference between these and the earlier figures.

The preliminary balances (columns 1,2 and 3) were drawn up before the completion of the agricultural year and before the consumption data for these years had been worked out. These balances were therefore based on anticipated consumption norms, seed, feed and industrial use norms. By deducting the rural, urban and industrial/army anticipated consumption from the production figure we get an indication of the remaining surplus

The grain forage balances for 1923/24 in mln.tons from various sources

	Gosplan Balances			TsSU Balances					Gosplan
	1	2a	2b	3a	3b	4	5	6	7
Gross Production	45.14	46.2	46.2	45.8	44.5	46.73	52.4	52.48	56.9
Consumption									
Rural									
Seed	9.17	9.12	9.55	8.7	8.7	8.88	9.4	9.50	11.34
Feed	4.90	5.75	6.39	6.3	6.3	6.31	6.90	10.04	8.76
Food	24.47	22.26	24.73	22.4	21.9	21.92	26.1	26.15	28.92
All rural	38.54	37.13	40.67	37.4	36.9	37.11	42.4	45.69	49.02
Urban									
Food	3.77	3.60	3.60	3.8	3.8	3.80	4.2	4.48	4.54
Feed						0.66	0.8	0.69	0.82
Army	0.56	0.57	0.57			0.69		0.59	0.70
Industry								0.21	0.82
Export		6.52	1.34			2.87		2.61	2.71
To Turkmenia & ZSFSR	>2.28			>4.6	>3.8	0.20	>5.0		
All Consumption		47.82	46.18			45.33		54.27	58.61
Stock change									
Visible		-0.62	0			+1.42		-1.09	-0.8
Peasant		-1.02	0			0		0	-0.88
All		-1.64	0			+1.42		-1.09	-1.68
Total	45.14	46.2	46.2	45.8	44.5	46.7	52.4	52.48	56.9
basic	42.86	41.32	44.86	41.9	41.3	42.41	48.1	50.96	55.87
conjunctural	2.28*	4.88	1.34	(3.9)*	(3.2)*	4.29	(4.3)*	1.52	1.03

Sources of data for 1923/24 grain forage balances

1. V.G.Groman, 'Obshchiye usloviya khlebnogo rynka v 1922/23 khoz.god.,' in Khleboprodukt, Prilozheniye k godnichnomu statisticheskomu otchetu o deyatelnosti Obshchestva, M.1923, pp.3-11.

2. V.G.Groman, Khoz.Polozheniye SSSR, Stat.Ekon.ocherka., M.1924, p.44
2a and 2b are two possible variants.

3. N.I.Dubenetsky, 'Khlebofurazhnyi balans respubliki na 1923/24 sel-kh.god.,' in E O ,1924, no.8, pp.36-46.
3a was based on the preliminary harvest evaluation made on July 1, 1923, 3b was based on the preliminary evaluation made at the time of first threshings.

4. P.I.Popov, Sel.Khoz. Soyuza respublik, M.1924, p.26.

5. Abrégé des données statistiques de l'URSS, M.1925, p.71.

6. 'Balans Narodnogo Khozyaistva SSSR 1923/24 goda,' Trudy TsSU,Tom XXIX, M.1926, part 1, pp.133-142, part 2, pp.54-262.

7. N.M.Vishnevsky, 'Khlebofurazhnyi balans', in BSE, Tom IV, M.1926, pp. 479 These figures also appeared in Kontrolniye Tsifry Nar.Khoz. SSSR na 1925/26gg., M.1925, pp. 74-5

Notes:

1,2,3 and 4 refer to the pre-1939 area of the USSR less ZSFSR, Turkmenia, and the Far Eastern Regions of the USSR.
5,6 and 7 refer to the pre-1939 area of the USSR
4, includes an allowance of 0.84 mln.tons to account for the production on Sovkhoz, estate and urban lands. Although it is not specifically stated it would appear that sources 5, 6 and 7 also included such an allowance.

which it is anticipated will be available for export and for a change in the level of stocks. In the preliminary balances given in columns 1 and 3 the remaining item is given as a whole 2.3 mln. tons in the early preliminary Gosplan balance (column 1) and 4 to 3.2 mln.tons in the preliminary TsSU balances (columns 3a and 3b) for comparable items[1]. However the later Gosplan preliminary balances (columns 2a and 2b) attempted to split this anticipated remainder up into its export and stock change components. In its most ambitious variant (column 2a) over six and a half mln.tons of grain are available for export. This is achieved by having relatively low rural consumption norms (some 10% below the 1922/23 level) and by a decline in stocks to about half their earlier level[2]. In its less ambitious variant (column 2b) where 1922/23 consumption norms are maintained and where there are no changes in stock only 1.34 mln.tons of grain are expected to be available for export.

The first final accounting balance which was constructed late in 1924 (column 4) appears to have kept preliminary normed rural and urban consumption data, but now offered firm export data 2.87 mln.tons and transport data to regions of the USSR not included in its own coverage, i.e. 0.2 mln.tons transported to Turkmenia and ZSFSR. This appears also to have been the first balance to have included a significant allocation for urban feed, 0.66 mln.tons. It should be noted that this was also the first balance that included the production of Sovkhozy, estates and urban lands which were together evaluated at about 0.84 mln.tons[3]. Although no direct means are available for distinguishing between these different elements, the data

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1. For comparability I have deducted 0.6 mln.tons from these TsSU remainders to make them more comparable with the early Gosplan remainder. The latter excludes an allocation of 0.57 mln.tons for army/industy use.
2. See V.Groman, Khoz.polozheniye SSSR, M.1924, p.44.
3. At this time kolkhoz data were included in peasant lands.

for subsequent years would indicate[1] that the urban level of production could have been about half of this and so could have accounted for a large share of urban feed allocation. This balance also provides an indication of a growth in visible stocks by 1.42 mln.tons. It is not clear how this figure was calculated, but since all the later data based on stock accounts indicate a decline in visible stocks, it would appear that this stock figure was calculated as a residual.

The most detailed final accounting balance data were those supplied in the major TsSU work on the balance of the national economy for 1923/24 which was published in 1926 (see column 6). This balance covers the whole of the pre-1939 area of the USSR, which alone would explain about 4.75 of the 5.75 million ton difference between this and the earlier TsSU balances. The remaining 1 million ton difference is explained in terms of a revised production figure[2].

Several of the balances are available with a regional breakdown. They have been summarised in the following table:

Regional grain forage balances for 1923/24 from various sources

(in mln. tons)

Region	Preliminary 3a	Preliminary 3b	Preliminary 4	Final 6	Final 6*
NCR	-2.61	-2.61	-2.61	-2.80	-2.88
SCR	-	-	-	+0.14	+0.12
SPR	+6.41 +6.07	+6.04 +3.69	+6.41	+6.26	+6.85
CPR	+1.03 +0.24 +0.06	+0.30 +0.08 +0.09	+1.18 +0.20	-0.57 -0.05	-0.35 0
USSR	+5.09 +4.57	+3.80 +3.27	+5.18	+3.00	+3.76

Sources: See appendices and table above.

Note : 6* includes visible stock changes.

1. See later balances for 1925/26 - 1928/29, pp. 631-648.
2. See Trudy TsSU, Tom XXIX, M.1926, p.121.

From these figures it can be seen that the level of deficiencies in the NCR was initially under-estimated, while the level of surpluses in the CPR and EPR was considerably over-estimated at first. According to this TsSU final balance, both the CPR and EPR were deficient in grain in 1923/24. Again the SPR is of predominant importance in providing surpluses.

The final TsSU balance also allows the 1923/24 utilisation balance to be investigated according to a breakdown into the different grains, flour, groats and bran.

d) Grain forage balances for 1924/25.

This was another disappointing year with production levels even lower than in 1923/24. All the available grain forage balances for 1924/25 have been listed in the following table:

Grain forage balances for 1924/25 in mln.tons from various sources

	TsSU Balances			Gosplan	
	1	2	3	4a	4b
Gross Production	45.7	42.83	46.5	51.84	51.7
Consumption					
Rural					
Seed	9.3	0.03	10.2	11.94	11.9
Feed	5.9	5.29	6.0	7.88	7.9
Food	24.4	21.70	24.8	27.18	27.1
All rural	39.7	36.02	41.0	47.0	
Urban					
Food		4.46	4.2	4.24	4.2
Feed			0.7	0.82	0.9
All Urban	4.93	4.46	4.9	5.06	
Industry		0.49	0.6	0.9	0.9
Army				0.7	0.6
Export	+1.07	1.43[x] 1.84[x]	0	-0.33	-0.3
All consumption	+1.07	42.39-42.80	46.5	53.33	53.2
Stock changes					
visible		+0.44-+0.03		+0.48	
peasant				-1.97	
all		+0.44-+0.03		-1.49	-1.5
Total	45.7	42.83	46.5	51.84	51.7
basic part	45.0	40.96	46.5	53.66	53.5
conjunctural part	(0.47)	1.87	0	-1.82	-1.8

Sources:
1. N.Dubenetsky, in Narodnoye Khozyaistvo SSSR 1923/24g., M.1924, p.40. See also P.I.Popov in Selskoye Khozyaistvo na putyakh vosstanovleniya, M.1924, p. 37.
2. P.I.Popov in Ekon.Obozr., 1924, No.23/24, pp.LXVIII-LXIX.
3. Abrégé des données statistiques de l'URSS, M.1925, p.71

Sources cont'd:

4a. N.M.Vishnevsky, 'Khlebofurazhnyi balans', in BSE, Tom IV, M.1926, p.479. See also

4b. Kontrolniye Tsifry Nar.Khoz.SSSR na 1925/26gg. M.1925 pp.74-75.

Notes: 1, covers all main grains in all the area of the USSR for peasant lands only,
3, covers Sovkhozy and all USSR
2, probably excludes

x data include 0.2mln.tons exported to SCR.

It will be readily seen that far fewer alternative variants were published in this year than in earlier years. In fact the variety is even less than it appears because all the three preliminary TsSU balances are really based on different parts of the same production data. The figures in column 1 refer to peasant production in the area of the pre-1939 area of the USSR. The figures in column 2 refer to peasant production in the pre-1939 area of the USSR less ZSFSR, Turkmenia and the Far Eastern Region. And the figures in column 3 refer to the production of peasants, Sovkhozy, allotment and urban lands in all the area of the pre-1939 area of the USSR.

All these preliminary figures represent a quite significant decline in production in comparison with 1923 — a decline of between 3 and 5.9 mln.tons depending upon which coverage we take.

On the utilisation side there is slightly more variety between these variants, and there is certainly more variety than can be explained by the differences in coverage. After deducting the basic rural and urban consumption data from gross production, the data in column 1 expected a conjunctural remainder of 1.1 mln.tons of grain to be allocated between export, army and industrial production and stock changes. The data in column 2

had a much larger surplus of 2.36 mln.tons. Only about 0.2 mln.tons of the difference could be explained in terms of the inclusion of the deficient SCR in column 1, the remainder appears to be explained in terms of the use of much lower basic consumption norms. The data in column 3 on the other hand had an even lower potential surplus of only 0.6 mln.tons. This was enough to provide for army and industrial utilisation and left nothing for export or changes in stock.

Apart from the already mentioned TsSU balances, there were no detailed final accounting balances produced for 1924/25 that were at all comparable with the 1923/24 final accounting balance or with the later Expert Soviet accounting balances for 1925/26-1927/28. The only final accounting balances that we have for 1924/25 are the ones given in sources 3 and 4. The balance given in column 3 has already been mentioned and its standing as a final accounting balance is rather dubious due to the lack of any data on stock changes. The data given in the Gosplan balance, column 4, is certainly based on an entirely different balance and does appear to be a final accounting balance.

The contemporary Gosplan evaluation which was made in 1925 by N.M. Vishnevsky (see column 4) provides a series of much higher figures but indicates the same serious condition. According to Gosplan the level of production in 1924 had been 51.84 million tons which was 5.1 million tons lower than in 1923. And whereas in 1923 there had been, according to Gosplan, a surplus of 2.55 mln.tons after basic rural and urban consumption, in 1924 there was a deficit of 0.22 mln.tons. Basic rural and urban consumption, industrial and army utilisation were according to this source supplemented by imports of 0.33 mln.tons and an overall decline in the level of stocks by 1.49 mln.tons.

Unfortunately the only available regional breakdown for this year covers the relatively favourable situation as seen at the time of the first prelimina

TsSU evaluation (i.e. source 1). The regional breakdown as given in this source is presented over page.

The preliminary grain forage balance for 1924/25 in mln. tons.

From N. Dubenetsky in Nar Khoz. SSSR 1923/24g., M.1924, p.40.

		Population			Rural Consumption							
		Rural	Urban	Prodn.	Seed	Feed	Rural food	All Rural	Surplus or deficit from agr.	Urban cons.	General cons.	Surplus or deficit of region
Consumer Region	NCR	24.78		7.48	1.72	1.18	5.28	8.18	-0.70	1.43	9.61	-2.13
Turkestan & ZSFSR	SCR			2.99	0.37	0.46	1.99	2.81	+0.17	0.42	3.23	-0.24
UkSSR		22.51		12.24	2.16	1.69	5.38	9.23	+3.01	1.14	10.37	+1.87
Sev. Kavkhoz		6.32		3.20	0.59	0.36	1.27	2.21	+0.98	0.30	2.52	+0.68
	SPR	28.83		15.44	2.75	2.05	6.65	11.44	+3.99	1.44	12.89	+2.55
Producer Region	CPR	37.70		14.33	3.56	1.67	7.72	12.95	+1.37	1.17	14.12	+0.20
Sibirin & FCR		8.63		4.50	0.78	0.49	2.26	3.53	+0.97	0.35	3.88	+0.63
Kirgizin		3.76		0.96	0.12	0.08	0.55	0.81	+0.15	0.11	0.93	+0.04
	EPR	12.33		5.46	0.90	0.57	2.81	4.34	+1.12	0.46	4.81	+0.67
All USSR		111.40		45.69	9.34	5.93	24.45	39.72	+5.96	3.29	44.65	+1.04

e) Grain forage balances for 1925/26

All the available grain forage balances for 1925/26 have been listed in the following table: see over page. Gosplan provided a very large preliminary balance of 77 mln.tons in its first draft of the 1925/26 control figures (see column 1) but revised this to 71.9 mln.tons early in 1926 (see column 2). TsSU provided successively three variants of its preliminary balance (columns 3, 4, and 5) all in 1925. Three variants of a final accounting balance were provided by the Expert Soviet in the autumn of 1926 (column 6), in the autumn of 1927 (column 7) and in the autumn of 1928 (column 8).

All sources agree that the 1925 harvest was at last a great improvement on the earlier harvests and almost as large as the average pre-war level of harvests. All sources agree that the 1925 harvest was at least 20 million tons larger than the 1924 harvest i.e. between 38 and 49% larger depending upon what figures are accepted. The first preliminary Gosplan figures (column 1) was 25 million tons higher than the 1924 harvest and slightly higher than the average 1908-1912 level. After deducting the basic rural and urban consumption elements from production this balance indicates a surplus of 15.5 mln.tons. Industry and army were expected to consume respectively 0.98 mln.tons and 0.7 mln.tons which would still leave 13.82 mln.tons. Gosplan anticipated that over half of this, some 7.6 mln. tons would go to build up stocks (primarily peasant stocks 5.96 mln.tons) and that it would still be possible to export 6.22 mln.tons.

TsSU, as always took a much more careful view. The harvest evaluation was much lower (between 61 and 68 mln.tons according to evaluations made at different times) and the anticipated surplus after basic rural and urban utilisation was also much lower (between 14 and 8 million tons according to different evaluations). It is important to note how the TsSU harvest

Grain forage balances for 1925/26 from various sources in mln.tons.

	Gosplan		TsSU Balances			Expert Soviet Balances		
	1	2	3	4	5	6	7	8
Production								
Peasant						69.60	72.41	72.66
SF & CF						1.47	1.56	1.45
Urban						0.49	0.52	0.54
Gross Production	76.99	71.9	64.26	67.9	64.47	71.56	74.49	74.65
Consumption								
Rural								
Seed	12.65	12.9	10.68	10.7	10.66	11.50	11.54	11.63
Feed	10.40	12.4	10.22- 11.24	10.2- 11.3	11.27	15.78	18.37	19.38
Food	32.51	31.4	27.53- 28.91	27.8- 29.2	29.21	27.52	27.01	27.36
Other	-	-	- -	- -	-	3.03	3.44	3.20
All rural	55.56	56.7	48.44- 50.83	48.7- 51.2	51.13	57.82	60.36	61.77
Urban								
Food	4.85	4.5	4.47- 4.68	4.6- 4.7	4.77	4.38	4.44	4.44
Feed	1.08	1.0	0.70- 0.75	0.7- 0.8	0.79	1.16	1.56	1.55
Other	-	-	- -	- -	-	0.23	0.16	0.30
All urban	5.93	5.5	5.18- 5.44	5.3- 5.5	5.55	5.77	6.16	6.35
Industry	0.98	1.4			0.98			
Army	0.7	0.5	0.98	1.0		0.98	0.98	1.02
Export	6.22	2.5				2.05*	2.05	2.06
All Consumption	69.39	66.6				66.62	69.55	71.20
			> 9.66- 7.01	>12.9- 10.2	8.30			
Stock changes								
Visible	+1.64					+0.41	+0.45	+0.34
Peasant	+5.96					+4.53	+4.43	+3.12
All	+7.60	+5.3				+4.94	+4.88	+3.46
Total	76.99	71.9	64.26	67.9	64.47	71.56	74.43	74.66
Conjunctural part	63.17	64.1	54.60- 57.25	55.0- 57.2	56.17	64.57	67.54	69.14
Basic part	13.82	7.8	9.66- 7.01	12.9- 10.2	8.30	6.99	6.89	5.52

Sources for the 1925/26 grain forage balances

1. Kontrolnye Tsifry Nar. Khoz. SSSR na 1925/26g., M.1925, pp.74-5.

2. N.M.Vishnevsky, 'Khlebo-furazhnyi balans', in BSE, Tom IV, M.1926 p.479.

3. N.I.Dubenetsky, 'Predpolozhitelnyi khlebofurazhnyi balans na 1925/26 god, (Doklad, zaslushannyi v Mezhduvedomstvennoi Komissii pri TsSU 21 iyulya 1925g.)', in Byulleten TsSU, No.105, July 15, 1925, p.68. See also N.Dubenetsky, 'Veroyatniye razmeryi urozhaya 1925 g. i ego otsenka', E O , 1925, August, pp.122-23

4. N.Dubenetsky, 'Urozhai i posevnaya ploshchad (po poslednyim dannyim)', E O , 1925, September, pp.106-107.

5. N.Dubenetsky, 'Posevnaya ploshchad i urozhai i ikh otsenka', E O. 1925, December, pp.91-92.

6. N.Dubenetsky, 'Khlebofurazhnyi balans SSSR 1925/26 i 1926/27 Sel.-Kh. godov,' S O , 1927, No.4, p.24.

7. 'Obyasnitelnaya zapiska k balansu zernovykh kultur po SSSR za 1925/26, 1926/27 i 1928/29 gody', in Predpolozhitelnyi khlebofurazhnyi balans na 1927/28 sel.khoz.god., M.1927, pp.28-31.

8. Osnovnyie elementy i produksiya Sel.Khoz.SSSR za 1925/26-1928/29 gg., M.1928, pp.117-31. Statisticheskii Spravochnik SSSR za 1928g., M.1929, p.228, and Sel.Khoz.SSSR, 1925-1928gg., M.1929, pp.340-44.

evaluations changed over this period, because the preliminary utilisation balances which were drawn up by TsSU followed also these changes in harvest evaluations. After a period of improving evaluations from June to August the evaluation fell dramatically at the time of the harvest because of harvesting problems. The figures given for these different preliminary evaluations are listed below:

(mln. s. of tons)

Time of evaluation	All land	Peasant only land
June 15, 1925	61.43	
July 1, 1925	64.26*	
July 15, 1925	67.88*+	66.62
August 1, 1925	68.26 +	65.99
After harvest	64.47*	

Source: N.Dubenetsky, E.C., 1925, no.12, pp. 89.

Note: Those figures with asterisks are the ones for which overall utilisation balances are available.
Those with + are the ones for which regional utilisation balances are available.

In our grain forage balance table above, column 3 refers to the July 1, evaluation for all land for all the pre-1939 area of the USSR, column 4 refers to the slightly higher evaluation of July 15 and column 5 refers to the later post-harvest evaluation when some adjustment had been made for harvesting losses in the unfortunate conditions in which the 1925 harvest was collected.

The initial preliminary balance of July 1 (column 3) anticipated a surplus of from 10.64 to 7.99 mln.tons once the basic rural and urban consumption had been deducted from production. This was between 5 and 7.5 mln.tons lower than had been anticipated by Gosplan's first preliminary balance. The higher July 15 evaluation (column 4) anticipated a comparable surplus of between 13.9 and 11.2 mln.tons. And the final preliminary evaluation (column 5) anticipated a surplus of only 9.28 mln.tons.

As already mentioned TsSU got into considerable trouble because of its 1925/26 grain forage balance and the conflict over it. Most of the trouble was concerned with the socio-economically differentiated aspects of the balance and the importance that was given to wealthy producers.

But part of the conflict came also because the extreme optimism that had been shown at the outset of the 1925/26 agricultural year proved to be unfounded. Gosplan had predicted that over 6 million tons of grain would be available for export and although TsSU had opposed this optimism TsSU was held responsible for the error when the collection agencies began to find it difficult to raise even 2 million tons of grain for exports.

In January 1926 Gosplan reluctantly revised its initial harvest evaluation and balance, and succeeded in blaming TsSU for its own errors[1]. The revised TsSU figures and the balance associated with them are given in column 2. The level of production was dropped by 5 million tons to 71.9 mln.tons and the level of available surpluses for export, stock change, industrial and military use fell from 15.5 to 9.7 million tons. The anticipated export item fell from 6.22 mln.tons to 2.5 million tons.

By the time that full final accounting balances were available TsSU had been significantly reformed, and the Expert Soviet had been formed with monopoly rights of grain forage balance evaluations. The first Expert

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1. See S.G.Wheatcroft, Views on grain output, agricultural reality and planning in the Soviet Union in the 1920s, M.Soc.Sc.thesis, Birmingham 1974, pp.44-45. Groman in Plan Khoz., 1926, No.2, p.86 claimed rather dishonestly that the control figures had been 'compiled in an atmosphere when it was necessary to beat off the persistent demands of TsSU and our operational organs to increase (sic my emphasis SGW.) the calculated gross production and particularly the commodity part of production'. The STO report on this matter appears to have partially, at least, accepted Groman's claim. 'Not all the blame for this unsuccessful economic orientation falls on Gosplan, the irregular relationship between Gosplan and TsSU played a negative role'. (Plan Khoz., 1926, no.2, p.57.).

Soviet accounting balance for 1925/26 was drawn up by the Expert Soviet in its session of October 13, 1926 and was published early in 1927. The figures are given here in column 6. The figures in this balance are in fact very similar to those given in the revised Gosplan balance (column 2). The gross production level of 71.6 mln.tons is just lower than this Gosplan figure of 71.9 mln.tons and over 7 mln.tons (over 10%) higher than the last preliminary TsSU figure (64.47 mln.tons). On the utilisation side this and all the subsequent Expert Soviet balances differ from the earlier balances by the inclusion of fairly significant 'other' items in both rural and urban consumption. For the 1925/26 balance the 'other rural' item covers 3.03 mln.tons and apparently includes such items as wastage by forming dust and dispersing (raspyl), unrecorded use as feed in fields (luzga) simply spoiling, and use on making home made alcohol (samogon)[1]. The less substantial 'other urban' item covering 0.2 mln.tons would cover similar wastage and unrecorded items. By means of these larger utilisation items the level of surpluses available after basic rural and urban consumption fell to just under 8 million tons of which 2.05 million tons was exported and 4.94 million accounted for in terms of increases in stocks.

In the following year in connection with work carried out in evaluating the preliminary balance for 1927/28 all the earlier balances were revised including the 1925/26 balance which was inflated by almost 3 million tons (see column 7). This inflation was primarily a consequence of inflating the livestock feed allocation by 2.6 mln.tons in rural areas and 0.4 mln.tons in urban areas. The non-basic surplus items remained about the same.

Finally in 1928 in connection with work on the preliminary balance for 1928/29 yet other adjustments were made. This time the overall level of production remained about the same. But there was a further increase in rural livestock feed by 1 million tons which was offset by a reduction

1. N.Dubenetsky, S O , 1927, No.4, p.24.

in the assumed size of peasant visible stock additions.

Regional grain forage balances are available for the preliminary TsSU evaluations of July 15 and August 1 and for the final Expert Soviet evaluations made in 1927 and 1928. These regional balances for preliminary and final accounting data for 1925/26 are given below in comparison with similar data for earlier years: (in mln. tons)

Region	1922/23 p	1923/24 p	1923/24 f	1924/25 p	1924/25 f	1925/26 p	1925/26 f
NCR	-1.83	-2.61	-2.88	-2.13		-2.48	-3.60
SCR			+0.12	-0.24		-0.44	-0.76
SPR	+4.09	+6.42	+6.85	+2.55		+12.00	+4.44
CPR	+0.41	+1.18	-0.55	+0.20		+2.98	+1.32
EPR	-0.44	+0.20	0	+0.67		+0.74	+0.76
All USSR			+3.76	+1.04	-0.22	+12.80	+2.06
USSR -SCR	+2.23	+5.18	+3.64	+1.28		+13.24	+2.82

Sources: See appendices

Notes: p = preliminary data

f = final data

From this table the scope of the disorientation of the 1925/26 preliminary balance can readily be seen in comparison with the final account data. However it should be realised that the above preliminary 1925/26 figures refer to the July 1, TsSU preliminary balance and not to the much larger Gosplan preliminary balance. The situation was much worse than anticipated in all areas apart from EPR where the final surplus was slightly higher than preliminarily expected. The deficits of the NCR and SCR were under-estimated by about 50%, while the surpluses of the SPR and CPR

were initially over-estimated by at least 200%. The figures for the earlier years indicate that a significant level of preliminary over-estimation of the level of surpluses was usual, but it had never been on such a large scale over 10 mln.tons as it appeared in 1925/26.

f) Grain forage balances for 1926/27

All the available grain forage balances for 1926/27 have been listed in the following table: see over page. After the formation of the Expert Soviet and the reform of TsSU in 1926 a much more cautious attitude was shown on the question of calculating and publishing grain forage balances. No other organisation than the Expert Soviet was allowed to calculate grain forage balances. And only very few of the preliminary balances which the Expert Soviet produced were published.

In all we have just three variants of the balance that was constructed for 1926/27. The first preliminary variant that we have was agreed on in the Expert Soviet on 13 October 1926, i.e. well after the harvest had been completed, but it was not published until April 1927. It is given here in column 1. A revised version was made at the time of the preliminary evaluation of the 1927/28 grain forage balance on the 18 November 1927 and this was published in a source at about this time (see column 2). By this time the preliminary results of the 1926 demographic census would have been available and some of the more detailed budget investigation results for 1926/27. However there are signs that the results of the latter may not yet have been completed because of the delays caused by the working out of the 1926 census data. A further revision of the 1926/27 balance was made in connection with work on the preliminary balance for 1928/29 which was agreed at the Expert Soviet session on 12 October 1928. An account of this balance was published at the time and this is the balance which has subsequently found its way into several statistical handbooks. (See column 3 and listed sources).

These Expert Soviet balances differ from the earlier balances in their basic consumption part by the inclusion of fairly substantial 'Other' sections in rural and urban consumption as was explained earlier above.

Grain forage balances for 1926/27 from various sources in mln.tons

	Expert Soviet Balances		
	13/10/26	18/11/27	12/10/28
	1	2	3
Production			
Peasant	74.33	76.22	76.56
SF & CF	1.49	1.57	1.34
Urban	0.48	0.45	0.49
Gross Production	76.30	78.24	78.40
Consumption			
Rural Seed	12.12	11.81	12.19
Feed	17.21	20.85	22.79
Food	28.77	27.19	27.24
Other	2.28	2.51	3.08
All Rural	60.38	62.35	65.30
Urban Seed	0.06	0.06	0.06
Food	4.73	4.59	4.56
Feed	1.22	1.65	1.55
Other	0.19	0.17	0.29
All Urban	6.20	6.47	6.47
Army & Industry	1.15	1.15	1.15
Export & Special Reserves	4.54	2.62	2.61
Stock Changes			
Visible	+0.66	+0.18	+0.01
Peasant	+3.39	+4.87	+2.91
All	+4.04	+5.05	+2.92
Total	76.30	78.24	78.40
Basic part	67.72	70.57	72.87
Conjunctural part	8.58	7.67	5.53

Sources: 1. N.I.Dubenetsky, S O ,1927, No.4, p.24

2. Obyasnitelnaya zapiska k balansu zernovykh kultur po SSSR za 1925/26, 1926/27 i 1928/29g./ in Predopolozhitelnyi khlebofurazhnyi balans na 1927/28 sel.khoz.god., M.1927, pp.28-31

3. Osnovniye elementy i produktsiya Sel.Khoz. SSSR za 1925/26-1928/29g M.1929, pp.340-44.

The content of the individual utilisation items and their reliability and comparability with the items in earlier balances has been dealt with earlier.

All three variants indicate a level of grain production in 1926 about 4 million tons or slightly more than in 1925. The preliminary balance (column 1) showed a level of gross production some 4.7 mln.tons higher than in 1925 and after the deduction of the basic consumption items it anticipated an 8.6 mln.ton level of surplus, 4.5 mln.tons of which it anticipated would be exported.

The revised figures in column 2 saw the overall level of gross production inflated by 1.9 mln.tons, but since the 1925 figures were also inflated at this time by 2.8 mln.tons the effect was to lower the indication of growth in comparison with the previous year. The basic consumption items in this variant were also inflated by a larger item than the increase in gross production, so the level of surplus was lowered by 0,9 mln.tons to 7.67 million tons. It was also noted at this time that the level of exports had been much lower than initially anticipated i.e. only 2.62 mln.tons. A larger item was therefore assumed for peasant stock additions i.e. 4.87 mln.tons instead of the figure of 3.39 mln.tons given in the preliminary variant. It should be noted that this assumption of the increased level of peasant stock was made on the eve of the 1927/28 procurements crisis.

The further revised figures that we have (column 3) indicate a slight further increase in grain production (0.34 mln.tons) but a much larger increase in the basic consumption items (2.95 mln.tons). The result of the adjustments are that the surplus item was cut from 7,67 mln.tons in column 2 to 5.53 mln.tons in column 3. The size of peasant stock additions was consequently assumed to have increased by a mere 2.92 mln.tons and not by

4.87 mln.tons as assumed in column 2. Such a revision would justify the claims of those peasants who had argued in vain that they had entered the 1927/28 year with far less grain stocks than had been accepted by the Soviet officials.

Unfortunately, no indication is available for the regional breakdown of the preliminary grain forage balance for 1926/27 (column 1) although regional breakdowns are available for the later variants. These regional variants are given below in comparison with the regional balances for earlier years:

(mln. tons)

Region	1925/6 p	1925/6 f	1926/7 p	1926/7 f
NCR	-2.48	-3.60		-4.03
SCR	-0.44	-0.76		-0.76
SPR	+12.29	+4.44		+4.01
CPR	+1.80	+1.07		+1.92
EPR	+1.63	+1.01		+1.48
USSR	+12.80	+2.06	+4.54	+2.61

Sources: see appendices

Notes: p = preliminary data

f = final account data

From this table it can be readily seen that the NCR was increasing its deficiency and that CPR and EPR were beginning to play a larger role in providing the surpluses. The level of surpluses indicated in the final account for 1926/27 was 1.9 mln.tons less than in the preliminary variant but where exactly this additional 1.9 mln.tons of surpluses were intially assumed to have been cannot be ascertained from the available evidence.

In May 1928 Stalin entered directly into the question of analysing the grain forage balance, in order to find an explanation for the difficulties that were being experienced on the grain front. He chose to compare the 1926/27 grain balance with the pre-war grain balance. But instead of giving any analysis of the changes in the specific utilisation elements or the different regional changes, he chose to place the whole weight of his argument upon an aggregate balance divided by sector of production. This will consequently be dealt with in the following section when I consider all the utilisation balances which have been differentiated according to type of producer. Here I will only consider the undifferentiated figures given by Stalin. They are reproduced below, in millions of tons.

	Gross Production	Surpluses Extra-rural marketed grain	% of marketings to all grain
Pre-war	81.9	21.3	26%
1926/27	77.8	10.3	13.3%

Source: I.V.Stalin, Sochineniya, M.1949, Tom 11, p.85.

Stalin's figures for pre-war production and extra-rural marketings are quite comparable with the TsSU figures for pre-war grain production and marketings which were given by P.I.Popov, and which have been cited in column 1b on p.247 above. The 1926/27 figures are totally comparable with the figures given by the Expert Soviet in 1927 and 1928, and which appear in columns 2 and 3 of the 1926/27 table of grain forage balances; see above p.641.

g) Grain forage balances for 1927/28

All the available grain forage balances for 1927/28 have been listed in the following table together with two versions of a later balance covering the calendar year 1928. (See over page). Column 1 refers to the preliminary balance for 1927/28 which was constructed by the Expert Soviet at its session on November 18, 1927 and which was published in a very specialised and narrowly circulated report at about this time[1].

The preliminary balance indicated that the 1927 harvest would be slightly lower than the 1926 harvest, 0.2 mln.tons lower than the preliminary evaluation for 1926/27 but over 2.1 mln.tons lower than the newly revised 1926/27 figure. The basic consumption items were expected to be slightly larger than those for the revised 1926/27 source, although of course this was significantly larger than the initial preliminary variant of the 1926/27 balance. As a consequence of this slightly lower level ofproduction and slightly higher level of basic utilisation, the anticipated available surplus (5.67 mln.tons) was significantly lower than the figure that had so far been given for the 1926/27 surplus (i.e. the preliminary figure of 8.58 mln.tons and the revised figure of 7.67 mln.tons).

But by the following year when the Export Soviet was considering the preliminary balance for 1928/29 it quite significantly revised its earlier figures for 1927/28 (See column 3). The level of production was lowered

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1. Unlike the earlier balances which were published in the statistical journals which were widely available, this document Predpolozhitelnyi khlebo-furazhnyi balans na 1927/28 sel.khoz.god., M.1927 only had a circulation of 1,000 copies and was not very widely discussed or cited in other printed matter. The account of the preliminary balance for 1928/29 and a revised version of the 1925/26-1927/28 balances (column 3 in the table in this section) had an even more restricted circulation of 500 copies. But by 1929 the figures from this final version had already appeared in several far more widely circulating statistical handbooks.

Grain forage balances for 1927/28 from various sources in mln.tons

	Expert Soviet Balances			TsUNKhU Balance	
	18/11/27		12/10/28	(1928 calendar year)	
	1	2	3	4	5
Production					
Peasant	74.13	73.12	71.72	73.07	73.07
SF & CF	1.50		1.40		
Urban	0.38		0.46		
Gross Production	76.02		73.58		
Consumption					
Rural					
Seed	12.31	12.28	12.28	12.08	12.08
Feed	20.49	23.30	23.30	21.68	18.53
Food	27.73	27.32	27.31	27.74	31.22
Other	1.84	2.93	2.92		
All Rural	62.37	65.83	65.82	61.50	61.83
Urban					
Seed	-	-	0.06		
Feed	1.73	1.64	1.54	0.83	1.86*
Food	4.84	4.99	4.91	2.34	5.37
Other	0.18	-	0.36		
All Urban	6.75	6.63	6.86	3.17	7.23
Industry & Army	1.23	1.01	1.24	5.40	1.50
Export	-	0.44	0.45	-0.13	-0.20
Stock changes					
Visible	-	-	-0.33	+0.86	+0.91
Peasant	+2.88	-0.79	-0.79	+2.16	+1.63
Total	76.02	73.12	73.26[x]	73.07	73.07
Basic part	70.35	73.47	73.92	70.18	70.63
Conjunctural part	5.67	-0.35	-0.66	2.89	2.34

Sources:

1. Predpolozhitelnyi khlebofurazhnyi balans na 1927/28 sel.khoz. god., M.1927, pp.28-31.
2. Pyatiletnyi plan razvitiya Nar.Khoz.SSSR, M.1929, Tom 2, vyp.1 p.333
3. Osnovniye elementy i produktsiya Sel.Khoz.SSSR za 1925/26-1928/29gg., M.1928, pp.117-31. See also Statisticheskii Spravochnik SSSR za 1928g., M.1929, p.228 and Sel.Khoz.SSSR 1925-1928gg., M.1929, pp.340-44.
4. Materialy po balansu Nar.Khoz.SSSR za 1928, 1929, 1930gg., M.1932, pp.259-261.
5. Yu.A.Moshkov, Zernovaya problema v gody sploshnoi kollektiviz atsia. M.1966 p. 231.

by 2.44 mln.tons and the level of basic consumption was increased by over 3.5 mln.tons as a result of which no surplus was available for export and stock increases and a deficit of 0.66 mln. tons had to be covered In fact, according to this balance there was a decrease in stocks by 1.11 mln.tons which made up the deficit and even allowed 0.45 mln.tons for export.

The balances given in columns 1 and 3 indicate that at the beginning of the 1927/28 agricultural year the Expert Soviet was advising all agencies that there was going to be a surplus of 5.7 mln.tons, while at the end of the year it acknowledged that there had been a deficit after basic consumption of 0.7 mln.tons. Overall it had over-estimated the available surplus by about 6.4 mln.tons; this must have considerably aggravated the procurement crisis.

The figures given in column 2 come from the first five year plan but are identical to those in column 3 but with the exclusion of grain produced on urban lands.

The balances given in columns 4 and 5 are the much later balances that appear to have been produced by TsUNKhU in 1932[1]. These balances were apparently drawn up for six monthly periods[2], but they have been combined to form calendar years instead of the more useful agricultural years The calendar year balance for 1928 therefore covers the last half of the 1927/28 agricultural year as well as the first half of the 1928/29 agricultural year. The balance in column 4 is available in considerable detail by grain, flour, groats and bran but is completely devoid of any regional breakdown. The data in column 5 as given by Moshkov are even devoid of differentiation by grain. These are final accounting balances and in

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1. The source of column 4 was a book published 'for official use only' with a circulation of only 500 copies. The source of column 5 is a modern Soviet monograph citing these data from the Soviet archives. Both these sources appear to be referring to the same balance.

2. See Istoriya Sovetskoi Gosudarstvennoi Statistiki, M.1960, p.367.

several respects are similar to the data in column 3. However, because of the chronology of these balances, the stock figures come half way through the agricultural year and include large quantities of grain which will be utilised in the given crop year before the next harvest.

The data in both columns 1 and 3 are available with a regional breakdown and these balances are given in the following table in comparison with the results of the balances for the two earlier years:

(in mln. tons)

	1925/26		1926/27		1927/28	
	p	f	p	f	p	f
Region						
NCR	-2.48	-3.60	-4.02	-3.35	-4.23	
SCR	-0.44	-0.76	-0.76	-0.86	-1.08	
SPR	+12.29	+4.44	+4.01	+3.66	+3.18	
CPR	+1.80	+1.07	+1.92	+2.43	+1.57	
EPR	+1.63	+1.01	+1.48	+0.90	+1.01	
USSR	+12.80	+2.06	+4,54	+2.61	+2.79	+0.45

Sources: See appendices

Notes: p = preliminary balance data
f = final balance data
Regional data include urban production.

Again we see that the preliminary balance expected shorter deficits in the deficit areas and larger surpluses in all the producer regions (with the exception of EPR) than were in fact realised. The NCR required an addition 0.88 mln.tons than was anticipated, the SCR an additional 0.22 mln. tons. The surplus in the SPR was 0.48 mln.tons lower than anticipated and 0.86 mln.tons short in the CPR. Only in the EPR was a better result received than had been anticipated as the surplus was 0.11 mln.tons larger than initially envisaged.

h) Grain forage balances for 1928/29

All the available grain forage balances which cover this period are listed in the following table: see over page. There is only one balance that covers the exact 1928/29 agricultural year and that is the preliminary balance constructed by the Expert Soviet in October 1928 (see column 1). All the other balances refer to calendar years either for 1928 which include either the first half of the 1928/29 year (columns 2 and 3) or for 1929 which includes the second half of the 1928/29 agricultural year (columns 4 and 5). These latter balances are accounting balances which appeared after 1932[1].

The preliminary balance given in column 1 anticipated that the level of gross production would be just lower than the 1927/28 level (lower by 0.18 mln.tons). The basic consumption items were expected to be slightly less than in 1927/28 and it was this which would allow a small surplus to be made.

The final accounting calendar year balances indicated a slight surplus in the 1928 year (column 2 gave a surplus of 2.89 mln.tons and column 3 gave a surplus of 2.34 mln.tons). And this slight surplus still remains in the 1929 calendar year balances (column 4 gives a surplus of 1.18 mln.tons and column 5 gives a surplus of 0.96 mln.tons). However a very sharp difference is indicated in these balances between the allocation of this surplus. In the 1928 calendar year balances the surplus is allocated to an addition to both peasant and visible stocks and imports run slightly larger than exports. But in the 1929 calendar year there is a very significant decline in the size of peasant stocks (between 6 and 6.2 million tons, see columns 4 and 5) which are transferred to even larger additions to visible stocks (over 7 million tons). These stock figures refer to January

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1. See note on p.646 above.

Grain forage balances for 1928/29 from various sources in mln.tons

	Expert Soviet Balance 1928/29	TsUNKhU Balances (Calendar year)			
		1928	1928	1929	1929
	1	2	3	4	5
Production					
Peasant	71.54	73.07	73.07	71.74	71.74
SF & CF	1.79				
Urban	0.47				
Gross Production	73.80				
Consumption					
Rural					
Seed	12.45	12.08	12.08	12.83	12.83
Feed	22.60	21.68	18.53	21.02	18.30
Food	27.74	27.74	31.22	27.49	30.35
Other	2.63				
All rural	65.42	61.50	61.83	61.34	61.48
Urban					
Seed	0.06				
Feed	1.54				
Food	4.84-				
Other	0.29				
All urban	6.73	3.17	7.23	2.72	7.45
Industry	1.31	4.88	1.50	5.44	1.55
Army		0.52	-	0.78	-
Export		-0.13	-0.20	0.19	0.16
All consumption	73.46	69.87	70.54	70.47	70.64
Stock changes					
Visible		+0.86	+0.91	+7.02	+7.02
Peasant	+0.34	+2.16	+1.63	-6.03	-6.22
All	+0.34	+3.02	+3.54	+0.99	+0.80
Total	73.80	73.07	73.08	71.74	71.44
Basic part	73.44	70.05	70.74	70.56	70.68
Conjunctural part	0.34	3.02	2.34	1.18	0.96

Sources: 1. Osnovniye Elementy i produktsiya Sel.Khoz.SSSR za 1925/26-1928/29gg., M.1928, pp.117-31, See also Statisticheskii Spravochnik SSSR za 1928g., M.1929, p.228 and Sel.Khoz.SSSR 1925-1928gg., M.1929, pp.340-44.

2&4. Materialy po balansu....,M.1932, pp.259-261.

3&5. Yu.A.Moshkov, ibid., M.1966, p.231.

1, and so are a little difficult to interpret in comparison with earlier stock figures. Nevertheless it does appear that in the middle of the 1928/29 crop year the level of stocks was overall 3 million tons higher than it had been in the middle of the previous year. And we may assume that it probably remained that high until the beginning of the next campaign[1]. The 1929 calendar year figures will be considered when we consider the 1929/30 balance in the next section.

As regards regional data for the 1928/29 balance the only regional breakdown available is that for the preliminary balance. It is given below in comparison with the regional balances for earlier years:

(mlns. of tons)

	1925/26		1926/27		1927/28		1928/29
	p	f	p	f	p	f	p
Region							
NCR	-2.48	-3.60	-4.03	-3.35	-4.23	-4.06	
SCR	-0.44	-0.76	-0.76	-0.86	-1.08	-0.80	
SPR	+12.29	+4.44	+4.01	+3.66	+3.18	+0.23	
CPR	+1.89	+1.08	+1.92	+2.43	+1.57	+2.31	
EPR	+1.63	+1.01	+1.48	+0.90	+1.01	+2.26	
USSR	+12.80	+2.06	+4.54	+2.61	+2.79	+0.45	0

Sources: See appendices

Notes: p = preliminary balance data,
f = final accounting balance data.

The most striking feature of this regional balance is the very low level of surpluses coming from the SPR. This is the first year since the beginning of NEP when the SPR had not been the major provider of grain surpluses. Of course we only have the preliminary figures to go on but as this table shows, there are no years when the final balance appeared in a more favourable light than the preliminary balance. And there was only one region (the EPR in

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1. For more details see section on stocks below.

1927/28) where the final balance was more favourable than the preliminary balance, and there were probably special circumstances involved in that area at that time[1]. The 1928/29 preliminary balance was not therefore likely to represent an under-optimistic picture of reality.

The reason for the low surplus in the SPR was primarily natural, due to the extraordinarily bad weather causing the worst winter killings ever recorded[2].

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1. This of course was where and when Stalin introduced his extraordinary measures (see below)
2. See S.G.Wheatcroft, SIPS No.11, Birmingham, 1977, p.32.
N.Rozov, S.i NK. 1928, No1, pp.36-38; A.Ponomarev, S.i NK. No.2, 1928, pp.66-8.

i) Grain forage balance for 1929/30

No grain forage balance for 1929/30 was ever published. In the table given over page I have listed all the available balances which cover the two calendar years 1929 and 1930.

The 1929 harvest was recorded to be slightly lower than the harvest the previous year, (1.33 mln.tons lower) and so the general features of the 1929/30 balance could be expected to be even more strained than those of the earlier years. By contrast the 1930 harvest was stated in the balances to be about 5.4 mln.tons larger than the 1929 harvest[1] and thereby provided the basis for relieving matters. As we shall see later, most of the additional 5.4 mln.tons production of grain was exported (4.8 mln.tons net in the 1930 calendar year), consequently there could have been little relief of the overall strain on the balance. Despite the increase in production in 1930 the basic level of agricultural consumption continued to fall through 1929 to 1930. Much of this was however offset by the increase in non-agricultural consumption. The major sign of the decrease in pressure after the 1930 harvest was that the decrease in peasant stocks that occurred in the 1929 calendar year was slightly reversed in 1930.

No regional breakdown at all is available for these balances. Much data are however available for the breakdown of the calendar year balances by type of grain, flour, groats and bran.

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1. Note: other sources claim it was much higher.

Grain forage balances for 1929 and 1930 from various sources in mln.tons.

	1929		1930	
	1	2	3	4
Production	71.74	71.74	77.17	77.17
Consumption				
Agricultural				
Seed	12.83	12.83	12.12	12.12
Feed	21.02	18.30	18.84	16.64
Food	27.49	30.35	26.27	29.91
Other				
All	61.34	61.48	57.23	58.67
Non-Agricultural				
Urban Feed		0.69		0.59
Food	1.89	5.50	2.04	7.02
authorities	0.77		0.82	
industry	5.44	1.55	8.25	1.60
transport	0.84	1.25	0.82	1.43
All non-agricultural	8.94	8.99	11.93	10.64
All basic consumption	70.28	70.47	69.16	69.31
Surplus	1.46	1.27	8.01	7.86
Export	0.28	0.28	4.87	4.87
Imports	0.09	0.12	0.08	0.10
Net exports	0.19	0.16	4.79	4.77
Losses	0.28	0.29	0.43	0.41
Stock changes				
Visible	+7.02	+7.02	+1.15	+1.51
Peasant	-6.03	-6.22	+1.37	+1.16
All	+0.99	+0.80	+2.52	+2.67

Sources: 1&3. Materialy po balansu...., M.1932, pp.259-61.
2&4. Yu.A.Moshkov, ibid., M.1966 , p 231.

7. Conclusions

After the Revolution the task of collecting reliable data on grain production became much more difficult. There were two major problems; a) the level of peasant concealment. This was a consequence of grain requisitioning and forced sales of grain at undesirable prices, and of the peasant's fear of a return of such measures. As we know the peasant had good reason to be suspicious.

b) the level of political pressure from the authorities who wanted to see indications of large grain surpluses. During the desperate years of War Communism the local procurement officials had been forced to resort to taking all the grain they could get their hands on. And even in the peaceful years of NEP the tendency was for the procurement officials to attempt to put pressure on the local and central statisticians to produce indications of the harvest which showed there to be large surpluses.

TsSU appears to have consolidated its independent position vis-a-vis local administrative pressures after the carrying out of the 1920 census and after the change to NEP in 1921. But this conflict remained in the background, with Gosplan and NKRKI actively on the side of the procurement officials.

Unlike the pre-war period the evaluations of the harvest prospect had great operational significance. TsSU had the task of constructing preliminary grain forage balances on the basis of the accounts of the preliminary harvest prospects in order to help orientate the planning of the procurements campaigns.

The tensions between the statisticians and the planners were felt at many levels, but became institutionalised in the form of the Expert

Soviet which was formed in 1926. The conflicts over harvest evaluations continued and in the autumn of 1929 there was the ultimate showdown between the statisticians and the procurement planners in which the statisticians were routed. This undoubtedly had a great influence on the ultimate evaluation of the 1929 harvest and its reliability, but the reliability of the data appears to have begun to suffer for political reasons well before then.

I will consider separately my conclusions concerning the reliability of the separate components of the production and utilisation data, before giving a general account of my conclusions concerning the actual levels of grain production and utilisation over this period.

First, the sown area data. These data as provided in the 1920 census undoubtedly involved a very large degree of under-reporting.

TsSU does appear to have been excessively cautious and slow in getting around to admitting this, but they were probably correct that given the complexity of the situation and the lack of experience and practice in dealing with such a situation there was nothing that could be done about it and that the application of any specific corrections other than the sophisticated half point correction would be, and was, arbitrary.

Later when more sophisticated control measures were carried out, and when the degree of peasant under-reporting had diminished, it would have been possible to get more reliable indicators of the size of sown area. But by this time the credibility of the statisticians had been severely strained in the eyes of political administrators and planners. The justification for the overall escalation in the scale of corrections applied to sown area data in the late 1920s is dubious. But unfortunately little information is available about the scale of corrections applied to the basic sown area data after 1927. The taxation data would indicate

that a much lower correction coefficient was applied to the 1928 data and Obukhov has argued that much lower corrections were needed in the later period because of the change in peasant attitude brought about by the contract system. But it still remains somewhat uncertain as to what extent correction coefficients were applied and how justified they were. There is no doubt however that later statistical indicators which compare the uncorrected pre-war grain sown area data with the late 1920s series give a very distorted picture. The effect is not simply an overall distortion causing the data in all regions to be distorted by the same amount, but it is regionally highly discriminating, leading to a much greater level of distortion in the producer regions than the consumer regions.

The yield data are probably even more unreliable than the sown area data. Although it is generally agreed that the initial half point correction was justified, there is some doubt as to the justification for the further corrections to yield. If it is accepted that the later investigations and surveys of sown area did lead to an improvement in sown area statistics and that they showed that peasant concealment had been higher than initially accepted, then it follows that if the utilisation studies had any significance at all, the level of correction to the yield data should have been diminished. A reduction in peasant suspicion may also have been expected to lead to a decline in the scale of correction coefficient. But instead of a decline we observed an increase in the level of correction in the mid 1920s and in the later 1920s. The carrying out of control reapings and threshings did appear to be approaching the position in which 'biological or semi-biological yield evaluations were being substituted for barn yield evaluations.

As regards utilisation data there was undoubtedly a very significant improvement in the scope and standard of food investigation studies. These were carried out on an extremely large scale and great care appears to have been taken over ensuring that a representative sample of households were surveyed. There was relatively little dispute over the reliability of the results from these surveys apart from a discussion of whether or not a 5% correction(downwards) was needed.

The results of the food surveys indicate a level of food consumption significantly lower than those provided by Klepikov, Chayanov and others before the War. I have suggested that this indicated more the pre-war exaggeration of consumption (because of subjective factors and the unrepresentative coverage of the pre-war budgets) than real changes in consumption levels. Regular publication of these data ceased in 1928, after the procurements crisis, but other apparently comparable data from later studies have been published more recently and indicate the beginning of a very severe decline in personal consumption after this period.

Data on livestock feed norms are much less satisfactory. They are based on an unspecified number of budget investigations and they probably over-estimate the level of grain fodder fed to animals in the late 1920s, but nevertheless even after adjustments have been made for this likely over-estimation they still indicate a very significant increase in grain utilisation for fodder in comparison with pre-war and earlier periods. I have accepted this as being a true indication of a significant change in the practice of livestock fodder provision. There is some evidence of a distinct improvement in the size and quality of livestock in these years[1], and the conjunctural position on the livestock market, with higher

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1. See above p.541. Drozdov was even talking about Russian agriculture being transformed into an Argentina-like agriculture.

* Note also Proyanishnikov v Pravda 1/7/1928 On exports

prices due to less state involvement, would certainly have provided a basis for such a change to take place. The position changes however after 1928 when the procurement crisis and extraordinary measures associated with it began to lead to a decline in livestock numbers.

The utilisation balances that were drawn up in the late 1920s not only reflected the high level of grain fodder utilisation indicated by these apparently uncorrected budget studies but indicated a level significantly higher. This may have been associated with the inclusion of 'ozadki' and other similar elements into the livestock fodder allowance, but is totally unjustified. It is also, in my opinion, unjustifiable to apply these livestock fodder norms to the level of Russian livestock in the pre-war period. However the effect of this inflation may be partially offset by there being a real need to inflate the numbers of pre-war livestock along the lines recommended by Vainshtein and described in Part One of this thesis.

The inclusion of large 'other' utilisation elements in the Expert Soviet balances of the late 1920s is only justifiable in terms of earlier production and utilisation figures if it is assumed, as I have argued, that the late 1920s production data include a larger element of non-utilisable and possibly biologically lost grain than was included in the earlier figures.

To ensure comparability between the early and late 1920s production and utilisation data we may either inflate the early series and receive a more biological/impure concept of grain production or we may deflate the latter series. In the thesis I have computed two variants of the production figures for the 1920s. The larger, more biological and impure variant of the late 1920s would require to be compared with a highly inflated level of pre-war grain production and would be more closely comparable to the post-1932 biological yield data, whereas the earlier 1920s variant

would require a much lower correction to the basic pre-war data and a higher deflation to the post-1932 biological yield data to be comparable.

Apart from this the level of production indicated in the evaluation of the 1929 harvest may suffer from additional inaccuracies caused by planning distortions.

The results of the statistical investigation of the level of production and utilisation in the post-revolutionary period indicate;

1. The level of grain production in the late 1920s was still substantially below the pre-war level. Because of the small number of years involved it is difficult to assess either the new trend in production or a meaningful average. But I would suggest that the level of harvests in 1925 and 1926 represent the peak years of a cycle and so should not be compared with the average years of a cycle that includes both peaks and troughs. The level of production in the peak years in the late 1920s did reach the average level of the immediate pre-war years taking peaks and troughs together. But I would maintain that the overall level remained lower. The sown area level which was subject to far more stability certainly remained lower overall. It is true that the rapid expansion of a third major producer region, the EPR, would have tended to cause an overall dampening of the fluctuations in the all union level of yields, but nevertheless this would not have greatly affected the situation.

In terms of per capita production these production levels clearly implied a substantial deterioration from the pre-war position. Although it was not fully realised at the time because of the uncertainty over population size before the

1926 census, the level of population had clearly reattained its pre-war level by the early 1920s. By 1927 it was 8% higher (about 11.4 million) and growing more rapidly than before the War at over 2.2% a year (about 3.3 million a year). The additional population in 1927 would have required an additional 2 3/4 to 3 million tons of grain to feed it. And each year probably an additional 1 million tons would be required.

The level of livestock had been very seriously depleted in the years of the famine, and although the numbers of cattle and pigs had reattained their 1916 levels by the mid 1920s, the number of horses was still below this level at the end of the period. In comparison with the pre-war levels of livestock, all types of livestock were still perhaps below their earlier levels. But they were increasing in numbers very rapidly until 1928 and they were probably much larger and healthier animals consuming more grain. Overall by the mid 1920s the livestock were probably not consuming less grain than before the War. The annual growth in livestock numbers after this point and until 1928 was in the order of 2 million horses, 2-3 million head of cattle and 2-3 million pigs. Given the 1923/24 fodder norms this would have required an additional 0.9 million tons of grain a year. But given the likely higher norms of fodder consumption of these years it probably required no less than an additional 1 1/4 million tons of grain a year.

Given a lower overall level of production, a disastrously low level of stocks in the early 1920s, an extra demand for,

say, 2 million tons of grain for personal food consumption in the mid 1920s above pre-war level and possibly an equal level of fodder consumption, it is not surprising that there were no large surpluses for export in 1925. Given the subsequent increase in demand for 1 million tons of grain a year for food and possibly 1 1/4 million tons a year for fodder and the failure of production to substantially rise, it is not surprising that the level of pre-war exports was not reattained.

2. In terms of a regional breakdown these figures indicate

a) The relatively large increase in grain production in the NCR over this period in comparison with the pre-war period. There is however considerable uncertainty as to the relative contribution of sown area and average yield growth to this development. My early 1920s and late 1920s variants of data provide very different indications as to their levels. The early 1920s variant offered a much more favourable picture as regards a growth in sown area, while the late 1920s data indicate a relative decline in sown area but a higher growth in yields. Both series however agree on there having been a growth in production by about 1 million tons.

On the utilisation side the NCR reattained its pre-war level of population in the mid 1920s and then had a growth of about 1.1 million a year. This was the only region where livestock levels were reported to be substantially above the 1916 level for all animals. Horse numbers in particular had reattained the 1916 level by 1928 and were

0.9 million (16%) higher in 1928.

The combination of higher livestock levels and higher population figures resulted in an increased demand for grain that offset this increase in production and required the NCR to import grain from other regions on the same kind of scale as it had done immediately before the War. This situation is confirmed by the transportation data that indicate that the NCR was importing about 4 million tons of grain a year in the late 1920s.

b) The production and utilisation data on the SCR are highly unreliable. But it is clear that there was a move towards increasing the specialised production of technical crops (especially cotton) in these regions and that led to there being an increased demand for grain. According to the transport data whereas the SCR was a net exporter of half a million tons of grain a year in 1913, by the late 1920s it was regularly importing 1 million tons of grain.

c) The absolute level of grain production in the SPR had only briefly reached the average pre-war level in 1925 when it had an exceptionally fine harvest. The level of sown area still remained about 8-10% below its pre-war level. The population however was already about 5% above its pre-war level in 1925 (2.1 million) and was rising at about 2.2% a year (0.8 million). It would consequently have required an additional half million tons of grain by the mid 1920s and then an additional 0.2 million tons a year.

There were reported to be over 30% less horses in this

region in the mid-1920s than there had been before the war, and although there was a rapid growth of about 10% a year (0.6 million a year) in the following years, their numbers were still below the 1916 level by the end of this period. This would have been one of the major factors in keeping the level of sown area relatively low.

Given the rise in fodder norms we cannot be sure that these animals consumed less than before the war.

The combination of a level of production in the late 1920s normally 1-3 million tons below the pre-war level, the certain increase in personal consumption by between 0.6 and 1 million tons in the late 1920s, and the uncertain changes in livestock feed requirements make it not surprising that the net exports from this region were about 4 million tons lower than before the war, as indicated by the transport data.

The serious fall in production in 1928 (5-7 million tons) associated with the exceptionally severe winter killings offset any possible exports in that year.

d) The CPR was already ailing before the war and suffered most seriously in the drought and famine of the early 1920s. Production levels had fallen the most here and were still far below the pre-war level (3-5 million tons) in the late 1920s. The level of sown area was still about 15% below the pre-war level in the late 1920s. The livestock levels had fallen to an exceptionally low level in the early 1920s and horse levels were still 15% below the 1916 level (and therefore probably even more below the pre-war level by the end

of the period). Again this would have been one of the main reasons for the fall in sown area.

The fall in livestock numbers was again probably not associated with much of a decline in grain fodder utilisation.

The famine in the early 1920s had led to a great increase in emigration from this area (a movement which was already quite noticeable before the war) and the population was consequently little above its pre-war level by the end of the 1920s.

Overall there were probably few changes in the scale of local utilisation, but the decline in production ensured that there would be few surpluses available for export from this region. The transport data in fact indicate a net export from this region of only 1 - 2 million tons a year in comparison with 5 million tons in 1913.

e) The EPR again presented the only favourable picture. The production of grain from this region was probably as much as 30-40% higher than the pre-war (1909/13) level in the late 1920s - about 4-5 million tons. This was mainly the consequence of a large increase in sown area, much of which had originally occurred during the war.

The population was however 14% higher (over 3 million) in 1925 and was increasing at about half a million a year. It would have required an extra three quarters of a million tons of grain in 1925, rising to one and a quarter to one and a half million tons by 1924. Horse numbers remained far below the 1916 level, let alone the pre-war level, but as already mentioned this did not mean that the total livestock grain

fodder utilisation for this region was less than before the war. It was probably a little higher because although there was some increase in net grain exports from this region as indicated by the transport data, the level of net export was only 1-2 million tons as opposed to 0.8 million tons in 1913.

The serious fall in the level of grain production by 4-5 million tons in 1929 therefore totally removed all possible grain exports from this region.

f) Overall the level of surpluses coming from the SPR, CPR and EPR in the late 1920s were only sufficient to provide for about 5 million tons of imports of grain into the two consumer regions. There was consequently no possibility of the NCR continuing to satisfy its needs for grain at a continuously increasing rate, and no way of resuming large grain exports. Any harvest shortfall in any of the producer regions was bound to result in a severe strain on supplies, but given the agrometeorological conditions prevalent in these regions such fluctuations were inevitable.

3. The Sovkhozy and Kolkhozy did produce a larger proportion of grain surpluses to their own requirements than did the peasant households but this was due to their use of extensive farming methods using much land and relatively little labour and livestock per area sown. In this they were similar to the former major pomeshchik estates and were most successful in the same region in the SPR. They offered no solution to the grain problem in the more over-populated regions of the NCR and CPR.

General conclusions

In this thesis I have described and presented much data characterising a) the nature of the pre-war and post-revolutionary grain balance and b) the official conceptions of this balance.

It has been argued a) that the balance was extremely complex and dynamic and that it had a rather delicate basis and b) that the official conceptions of this balance were unsatisfactory and led to unfortunate political decisions.

The pre-war Russian grain balance was delicate because Russia was exporting an extremely large amount of grain while producing relatively little.

The balance was dynamic because it was based upon very large and actually increasing rates of growth in both its production and utilisation elements. Between 1881 and 1914 the level of grain production rose by an average of 7.1% per year or 1.1 million tons per year[1].

Between 15 - 20% of this increased production was required as additional seed, i.e. about 0.2 million tons per year. The level of population rose by an average of 1.7% requiring at least an additional 0.6 mln.tons per year. This left a balance of 0.3 million tons per year of which two-thirds, 0.2 million tons, were exported. Little was left to intensify agricultural development. With the exception of relatively isolated regions like Siberia, livestock farming failed to develop and even suffered a depression.

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1. These are the figures for European Russia; the rates would of course be larger if Siberia was included.

The War and Revolution disturbed this balance.

Grain production suffered a major decline and although it may have approached its average pre-war level of production in exceptional odd years it certainly had not restored its pre-war dynamic.

Grain utilisation also suffered a decline but the decline in population and therefore personal consumption was not so great. Its level had been fully restored by the mid-1920s and so had its dynamic. Livestock levels had suffered more and were still low but a new dynamic of increasing and improving livestock farming was firmly established by the mid 1920s. A new balance of grain production and utilisation could only be achieved at the cost of reducing grain exports. And this might well have provided for a more steady and progressive basis for Soviet agriculture.

It could be argued that providing this kind of basis for agriculture could not be afforded, that it would have delayed industrialisation, and that it was essential to make agriculture produce surpluses to pay for industrialisation; but recent work by A.A.Barsov, James Miller and Michael Ellman has indicated that agriculture made no net positive contribution to industrial development in these years. And so depriving Soviet agriculture of a firm basis cannot be considered as a necessary cost of Soviet industrialisation.

Apart from this there is no evidence that Stalin or any of the major political figures anticipated the kind of destruction that occurred in Soviet agriculture.

I would rather describe what happened as being a consequence of a totally unsatisfactory conception of agricultural reality that led to

some faulty policy decisions and to the application of hasty ill-considered administrative force to resolve the temporary supply problems that continued to re-emerge.

Instead of considering the real level of production, the elements of utilisation, and their regional distribution, the authorities chose to exaggerate the level of production and to explain the failure of surpluses to emerge in an extremely superficial way.

The pomeshchik and early Sovkhoz and Kolkhoz farms produced much more grain than they consumed because they farmed large areas with relatively few men and animals per area sown. There was no way in which the 20 million peasant households could be converted into extensive farms. But they could have been converted into more intensive farms. Had there been a few more years with less unfortunate weather the trends of this new dynamic would have become more clear.

But instead we are left with the still rather indistinct signs of this newly emerging trend on the one hand, and the extremely clear and simple conception of the problems as given by Stalin. And it was upon Stalin's understanding of the situation that policy was formulated. Historians of this period need to be acquainted with the reality of Russian grain productic and its utilisation rather than with Stalin's very limited conception of it.